AN EVALUATION OF INDIVIDUALIZED INSTRUCTION IN MATHEMATICS IN AN APPRENTICESHIP PROGRAM AT THE COLLEGE OF TRADES AND TECHNOLOGY.

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AN EVALUATION OF INDIVIDUALIZED INSTRUCTION IN MATHEMATICS IN AN APPRENTICESHIP PROGRAM AT THE COLLEGE OF TRADES AND TECHNOLOGY

by

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ABSTRACT

The purpose of the study was to evaluate individualized instruction in mathematics in the Beauty Culture apprenticeship program at the College of Trades and Technology. Stake's model was used as the basis for evaluating the program. Seven variables were of particular interest in this study: (1) the Beauty Culture students, (2) the nature of the mathematics curriculum, (3) the instructional materials and facilities, (4) the instructional activities, (5) time allocation, (6) achievement on the first writing of the final exam for each module, and (7) the number of students completing the entire program.

Information and data about these seven variables were collected from a sample of 12 students employing the following techniques: observations by the investigator, formative and summative examination results, expectations of the trade theory instructor and a mathematics instructor, and the Beauty Culture course outline in use at the time.

The students were 12 Beauty Culture apprenticeship students who had completed a 9 month pre-employment program and had returned for 8 weeks further schooling. They had all been working for a minimum of 50 weeks. In addition, the average age of the group was found to be 22.8 years.

The curriculum was based on the Beauty Culture field with as much emphasis as possible on basic business practices. This was found to be consistent with what was expected (intents) and intended (standards).

The instructional materials consisted of seven modules, 52 formative examinations, and 14 summative examinations, all of which were developed by the investigator specifically for this study. The

facilities consisted of a typical classroom with individual student desks.

The instructional methodology used in this study was individualized instruction, which was what was expected and intended.

The time allotment of 16 hours working in class and 16 hours working out of class was considered to be sufficient. However, it was noted that students should not devote too much time to the easier modules at the beginning and neglect those that follow.

It was found that at least 80% of the students succeeded on the first writing of the final examination for Modules 1 to 4 only, while at least 70% succeeded on the first writing for all seven modules. These results were consistent with what was intended for the first four modules, but were consistent with the defined standard of at least a 50% success rate for all seven modules.

It was observed that, while 100% of the students completed the first four modules, only 67% completed all seven. These findings were inconsistent with what was intended (90%) and what was expected (80%).

Six major recommendations were presented. The first suggested that 50%, and not 80%, of the students be intended to succeed on the first writing of each summative examination. The second recommendation stated that most students should do only half the exercises in the first two modules, thereby leaving more time to work on the remaining modules. It was next recommended that an assistant be provided to help with clerical duties. The fourth recommendation was that class size be limited to 15 students. The fifth recommendation was to study the feasibility of individualized instruction in other areas. The final recommendation called for a similar study with regard to the use of computers.

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CHAPTER I

INTRODUCTION

Critics of the traditional educational approach, such as Bloom (1978), Dunn and Dunn (1972) and Johnson and Johnson (1970), point out problems with centering instruction around some time constraint such as a school year, term or semester, in which all students are expected to complete a set sequence of learning activities and successfully demonstrate some type of competence. A limited variety of learning activities are specified by the instructor to be applied to every student in the class. Adjusting the instructional level and speed to the average class member leaves the better students bored and unchallenged and the slower ones struggling for survival. In view of this problem, some educational institutions are now turning toward a self-motivated, individualized-learning approach where the instructor provides each student with the course content arranged in short modules or units, a minimum level of course competence for completion, and a series of learning activities helpful in attaining minimum competence. Students advance individually and independently at their own pace, utilizing only those learning activities needed to attain the required mastery level. The instructor's major role becomes one of a resource person and an evaluator of progress rather than as a lecturer.

Individualized instruction, the topic of the research problem in this study, has concerned educators and mathematics teachers in particular, for many years. It has been the focus of a great deal of research in the past, but even more is required. An attempt was made to alleviate some of the uncertainty in this area by scrutinizing an

individualized instructional program in mathematics. All possible effort was made to determine the success or failure of the program. The investigator examined the aims and objectives of the program and then attempted to determine whether or not they were met. With this type of information available it is possible to assess the effectiveness of the instructional method. If individualized instruction is successful in achieving the purposes of the course being scrutinized, then expansion to other courses can be advocated. These courses would also have to be closely monitored. If individualized instruction is not successful, then recommendations with regard to revisions and corrections can be made. Subsequent studies can be carried out to substantiate the finding of this study. It is hoped that in this way individualized instruction, particularly in mathematics, can be modified and refined to the extent that it will be successful with all students. This type of instruction undoubtedly has merit and holds great promise for the future. It is an instructional method that deserves careful consideration and a great deal of research. Only after such research has been completed can its full worth be appraised.

STATEMENT OF PROBLEM

The problem with which this study was concerned was one of instructional methodology. It is stated as follows: Is individualized instruction a successful method for post-secondary students at the College of Trades and Technology (St. John's) to achieve specified objectives in mathematics? A definition of individualized instruction will be given later, as will the criteria for determining the success of the instruction.

LIMITATIONS

The study was limited to individualized mathematics instruction in Beauty Culture apprenticeship courses at the College of Trades and Technology. No attempt was made in this study to expand the use of such instruction into other courses, such as medical science and technical courses; nor other programs, such as plumbing and motor-vehicle repair. However, this does not mean to imply that individualized instruction can be successful only under these conditions. It is recognized that such instruction appears to have great value for the future in almost all subject areas. Investigation in these areas is beyond the intended scope of this study and is left to other researchers.

JUSTIFICATION FOR STUDY

Individualized instruction is now being used by various instructors at the College of Trades and Technology. A major portion of the Business Education Department has adopted the SPI (Self-Paced Instruction) methodology and offers courses on a 12 month, continuous-intake basis. In addition, mathematics courses for barber/stylist students, cooking students, motor vehicle repair (body) apprenticeship students, some motor vehicle repair (mechanical) apprenticeship students and others have been individualized. This transfer to individualized instruction has been carried out with generally very little research devoted to its effectiveness. Since the College encourages all instructors to individualize instruction in their courses, it was felt that the study which was undertaken was a necessary, and indeed a vitally important one. Without such research, it is

impossible to assess the degree of success or failure of the individualized method of instruction. It was hoped that this study would contribute to this research.

All of the materials used in this study, including the modules and the examinations, were prepared by the investigator. The topics included in the course were those that are of benefit to the Beauty Culture apprenticeship students. It was the purpose of this study to determine the effectiveness of the individualized instruction mode of presentation.

CHAPTER II

REVIEW OF RELATED LITERATURE

The full significance of a study concerning individualization of the teaching of mathematics cannot be appreciated without an overview of the vast amount of literature and research available on the topic. In this chapter the literature is discussed under nine main categories: (1) Transfer and Application, (2) Retention, (3) Ability Levels, (4) Rate of Progress, (5) Student Attitudes and Personality Variables, (6) Study Skills, (7) Achievement and Computation, (8) Cost, (9) General. Before discussing the above, some of the available literature and research dealing with mastery learning are presented.

MASTERY LEARNING

Mastery learning is a topic which must be considered when discussing any form of individualized instruction. Block and Anderson (1975) considered mastery learning to be a teaching philosophy and that under appropriate conditions virtually all students could learn well most of what they were taught in school. One of the earliest views of mastery learning was put forward by Carroll (1963). His model of school learning proposed that each student could master a given subject if he was provided the time he needed to learn. Bloom (1976) asserted that all views of mastery learning "begin with the notion that most students can attain a high level of learning capability if instruction is approached sensitively and systematically, if students are helped when and where they have learning difficulties, if they are given sufficient time to achieve mastery, and if there is some clear

criterion of what constitutes mastery" (p. 4). He went on to present his latest theory, which holds that under appropriate learning conditions individual differences in learning ability, rate of learning, and motivation for further learning should approach a vanishing point. That is, virtually all learners should learn excellently, quickly, and self-confidently.

Block (1979) stated that "mastery learning works" and researchers are now "beginning to investigate components of the system" (p. 114). Hyman and Cohen (1979) said that "learning for mastery is consistently more effective than traditional curriculums" (p. 105). They continued by saying that "individualized learning for mastery designs are more effective than group learning for mastery methods" (p. 105). In addition, they concluded that "students master more objectives with mastery learning because their level of participation is higher" (p. 106). According to Burns (1979), "research evidence shows that mastery learning is much more effective than conventional methods" (p. 110).

Mastery learning, however, is not completely without opponents. Glickman (1979) believed that "we do students a great disservice by assuming that they are the same and should learn the same material at the same rate" (p. 101). He felt that "mastery learning stifles individuality" (p. 100). According to Horton (1979), mastery learning "is neither simple nor readily acceptable to regular classrooms on a large scale, as many of its proponents have claimed" (p. 156). He went on to say that "we will probably find that it will never be the answer for everyone or even for most but we may very well find it useful for some teachers to use in some situations to teach some

children some things" (p. 156).

As can be seen, mastery learning and individualized instruction are related to each other. Any study of individualized instruction must also consider mastery learning if the study is to have any significance whatsoever. Block (1979) stated that one of the important features of mastery learning "is the degree to which it encourages cooperative individualism in student learning" (p. 117). Also, Abrams (1979) asserted that mastery learning "provides through its diagnostic-corrective-extension activities a high degree of individualization" (p. 137). Thus, mastery learning and individualized instruction are practically inseparable, and any discussion of one necessarily entails consideration of the other.

INDIVIDUALIZED INSTRUCTION

Before examining each of the previously listed nine categories it is essential to get a clear understanding of the nature of individualized instruction. According to Willoughby (1976) "the teaching of mathematics has always been individualized" (p. 338). The instructor delivers a lecture which is individually ignored by students whenever they feel like it. Good teachers have always tried to do more than this to help individual students. Attempts at individualizing instruction included the following: homogeneous grouping and tracking, grouping within classes, choice of course to study, use of students as teachers' helpers, differentiated assignments, tutoring, team teaching, flexible scheduling, nongraded schools, continuous-progress plans, "free schools", computer-assisted instruction, programmed instruction, independent study, performanced-based curricula, and mathematics laboratories.

Most of these attempts at individualization have taken place over a great many years. Although some seem to be quite different, they all have certain things in common. They have all been developed for the purpose of improving instruction and hence, the quality of education. They have all been somewhat successful at some time or other. No one attempt has been proven to be superior to the others for all teachers and all students. However, it is important to remember that each attempt has something useful in it for some students under some learning conditions. It is up to the teacher to extract what is useful and put it to good use.

As can be readily seen, individualized instruction can take on many different forms. According to Miller (1976), "individualized instruction consists of three components: (1) student participation in setting goals, (2) self pacing, and (3) student participation in the evaluation process" (p. 345). This definition, however, is not universally accepted. Some authors and researchers do not consider student participation in setting goals and in evaluation, while others consider it to be essential. The notion of student self-pacing, on the other hand, is common to all work in the area.

Lipson (1970) defined individualization as "the act of improving instruction by using and taking into account the individual or unique characteristics of the student" (p. 2). He suggested several possible elements of individualization in mathematics classes. Some of these elements included individual paths to the same objectives, different objectives for different students, different completion times for the same objectives, and individually selected problems. Lipson also felt that "a group assignment can be an important part

of individualization" (p. 3). That is, it is not necessary for each student to be working on something entirely different from all the other students in the group. As long as the assignment is completed individually is all that matters.

According to Campbell and Kush (1974), "the materials we use are individualized only to the extent that a student works through them at his or her own level and at his or her own rate" (p. 22). They felt that self-pacing is the most important aspect of individualized instruction and is absolutely essential.

Larsson (1973) gave a definition of individualized mathematics teaching which had five main points: (1) the work of each pupil is directed at achieving a goal that is adapted to his particular ability and interests; (2) instructions are given to one pupil at a time; (3) the number of tasks and their degree of difficulty vary from pupil to pupil; (4) each pupil works at his own rate and with methods and material that suit his ability; and (5) the teacher evaluates the work of each pupil on the basis of the pupil's ability. This definition seems to be the most comprehensive one put forth to date. It encompasses all aspects of individualization which are necessary for a successful program using this method of instruction.

Now that individualized instruction has been defined, it is important to distinguish it from so-called traditional instruction. The latter has been defined by Miller (1976) as "all methods in which pupils are taught as a class" (p. 345). This includes both homogeneous and heterogeneous grouping. In addition, it includes all the techniques (audio-visual aids, committee work, parent consultations and so on) that have been traditionally used by teachers to help students

learn.

Transfer and Application

Transfer and application are topics that are of concern to all educators, especially those involved in the development of a new curriculum or a new instructional method. Gilbert (1976) found that in fourth-grade a semi-individualized method resulted in significantly higher scores on computation and application tests than a "contract method." Similarly, LaPlaca (1973) found that eighth-grade basic mathematics students enrolled in an individualized program had significantly high arithemetical application scores. However, Wheaton (1971) concluded that traditionally taught secondary school students gained significantly more in arithemetic applications. Hirsch (1977) found that a guided discovery group in grade 11 had significantly higher transfer scores than either of two individualized instruction groups.

Since there are so few studies, it appears that the topics of transfer and application have not been adequately considered in the research on individualization of mathematics instruction. They are, however, important areas which need to be studied more closely in future research.

Retention

Retention is also a topic of concern to educators experimenting with new materials and methods. Bazik (1973) found no significant differences in retention for prospective elementary school teachers enrolled in an individualized mathematics course compared to those enrolled in a traditional lecture course. Chatterley (1973) also

found no differences for retention when comparing four different self-instructional modes of individualized instruction for a unit on an introduction to integers in grade seven. In addition, Pigford (1975) concluded that there was no significant difference in retention between an individual laboratory method and a group teacher-demonstration method in teaching measurement and estimation to preservice elementary school teachers. Kontogianes (1974), however, did find a significant difference favoring the experimental group (individualized instruction) for a unit on sets with prospective elementary school teachers.

As evidenced by the small number of studies, retention, like transfer and application, has not been adequately investigated in individualized mathematics programs. It is noted that this particular area holds great promise for future research.

Ability Levels

Ability levels and the determination of which particular level is most suitable to individualized instruction have received a considerable amount of attention. Hanneman (1972) found that most of the tenth-grade geometry students in a "high performance subgroup" of individualized instruction maintained a pace slower than that of the conventional group. Crangle (1971), on the other hand, found no difference with regard to ability level in the speed with which eighth-grade mathematics students proceeded through an individualized course. Lach (1970) concluded that for seventh-grade pupils matched for IQ, programmed materials were superior to teacher-led work on sample exercises. Nix (1970) found that eighth-grade students with low IQ and those with average mathematics ability achieved significantly more under individualized instruction than under group-oriented

instruction. Similarly, Yomtoob (1975) stated that an individualized instructional program appeared better for low achievers in grades four and five.

These results present a mixed picture of the relationship between individualized instruction and ability levels. Based upon the findings stated above and the extensive reading carried out on the topic by the investigator, it is concluded that there is minor support for individualized instruction benefiting low-ability students.

Rate of Progress

The rate of progress of students in individualized programs is an important factor which has to be considered in any discussion of the effectiveness of such programs. Eshiwani (1975) found that the use of programmed materials in high school mathematics was effective in terms of time spent on the materials. Fisher (1973) found that for eleventh-grade students who elected geometry in their program of studies, the individualized method of teaching geometry was faster than the traditional method. For tenth-grade students, Bull (1971) also found that the individualized method was faster for teaching geometry. However, Hanneman (1972) found that tenth-grade geometry students using individualized instruction had a slower rate of progress than students using conventional group instruction. Similarly, Crangle (1971) concluded that individualized instruction in eighth-grade mathematics took more time.

Sutton (1967) stated that student personality factors greatly influence the rate of progress through individualized materials. It must be remembered that motivation plays a significant role in deter-

mining the rate of progress through an individualized mathematics program. In this regard, motivational factors must be considered as playing a major role in the amount of time a student spends in the program.

As can be readily seen, rate of progress depends on many factors for each individual learner. Some of these factors include: mode of instruction, difficulty of the learning task, motivation, student ability, and personality. As a result of the many variables contributing to the learning rate of one individual student, mixed results for larger groups of students must be expected.

Student Attitudes and Personality Variables

Edwards (1975) found that attitudes of prospective elementary school teachers in a traditional mathematics class were significantly more positive than those of students in a self-paced individualized class. On the other hand, Lach (1970) found that attitudes of seventh-grade mathematics students were generally higher for those using programmed materials than for those using a teacher-led approach. Rubillo (1970) concluded that college students using individualized materials scored significantly higher on attitude measures than students having traditional instruction. Also, Pond (1973) stated that a program of individualized instruction for prospective elementary school teachers had a sifnificant positive effect on students' attitudes toward individualized instruction. Similarly, Fernandez (1972) found that first-year algebra students using an individualized program had a more favorable attitude than

students in a nearby school using a traditional program.

Thomas (1972) also found that student attitude in sixth-grade mathematics was more favorable toward an individually prescribed instruction than toward a conventional method of instruction. MacIntosh (1976) stated that the attitudes of elementary school pupils using the Individualized Mathematics System (IMS) approach were more positive than the attitudes of those pupils using a conventional textbook-centered approach. However, Shumaker (1973) found no significant difference in attitudes between seventh-grade mathematics students who had an IPI (Individually Prescribed Instruction) or a non-IPI program. Williams (1976) concluded that neither an individually-paced method nor a lecture-discussion-problem-solving method had a significant effect upon student attitude toward mathematics in grade 13. Similarly, Yomtoob (1975) stated that individualized instruction did not in general affect student attitudes in grades four and five. Bowen (1974), Corbin (1974) and Horvath (1976) also found no significant difference in attitude between groups of seventh-grade mathematics students using an individualized or a conventional program. Drum (1974) mad a similar statement when referring to prospective elementary school teachers enrolled in a mathematics course at East Texas State University.

With regard to student personality factors, Sutton (1967) found that such factors greatly influence the rate of progress through individualized materials. Several researchers were also concerned with self-esteem. Yomtoob (1975) stated that self-concept was unaffected by whether or not the instruction was individualized. Wallen (1976) found no significant differences in self-esteem between students in

traditional programs and those in individualized programs. Mayfield (1974), however, did find that an individualized group of fourth-grade pupils scored significantly higher on some self-concept scales than did a traditional group. Nanney (1974) also found that changes in self-concept scores favored an individualized group over a traditional group in grade seven. With regard to the affective domain, Bellamy (1976) concluded that the affective reactions of junior high school students in an individualized mathematics program were more positive than the reactions of those in a traditional mathematics program.

Study Skills

The study skills possessed and required by students play an important role in the success or failure of any new program or instructional method. Nonetheless, the amount of research devoted to this area has been minimal. Shumaker (1973) found no significant differences for study habits and study attitudes in mathematics between IPI and non-IPI seventh-grade students. Crangle (1971) likewise found no significant differences in work study skills between eighth-grade students taught mathematics by traditional instruction and those taught by individualized instruction. Because of the extremely small number of studies, it is unwise to make broad, general statements about the relationship between study skills and individualized instruction.

Achievement and Computation

Achievement and computation are the two topics with which most research on individualized instruction has dealt. Hirsch (1973) found that a guided discovery group of eleventh-grade students had signif-

icantly higher achievement scores in mathematics than either of two individualized instruction groups. Whipple (1972) stated that eighth-grade geometry students who used a laboratory approach with manipulative materials scored higher than students using individualized instruction units. Fielder (1972) found that non-IPI groups of students in mathematics classes in grades three to six generally achieved better than IPI groups. Wallen (1976), Crangle (1971), Verheul (1972) and Wasden (1971) all concluded that students taught mathematics by traditional instruction achieved significantly more than those taught by individualized instruction.

On the other hand, Lach (1970) found that achievement was generally higher for seventh-grade students using programmed workbooks than for those having teacher-led work on sample exercises. Nix (1970) stated that eighth-grade students achieved significantly more under individualized instruction than under group-oriented instruction. Struik (1977) found that college students in a self-paced calculus course had a significantly higher mean score than those in a traditional course. Similarly, Broussard (1971) concluded that fourth-grade students given individually prescribed work through independent study, small-group discussions, large-group activities, and teacher-led discussions achieved significantly higher in mathematical skills and concepts than those taught by a traditional, textbook class-group method. Rubillo (1974), Kontogianes (1974), LaPlace (1973), Beul (1974) and Flournoy (1974) all found that students using individualized materials scored significantly higher on mathematical achievement measures than students having traditional instruction. Bull (1971), Clough (1971), Burtley (1975), Baley and Benesch (1969), Nanney (1974)

and Pusey (1974) likewise found that the mean change in achievement scores was significantly greater for students in an individualized mathematics program than for those in a traditional program. Jerman (1973) stated that elementary school students in mathematics using a wanted-given approach or general problem-solving techniques did not score significantly higher than control groups when number of correct answers was the criterion, but did use a correct procedure significantly more often, especially with a wanted-given approach. Williams (1976) concluded than an individually-paced method resulted in greater achievement change than a lecture-discussion-problem-solving method in grade thirteen mathematics.

Not all studies, however, were able to reach a decision regarding the superiority with respect to achievement of one instructional method over another. Lober (1974) found that students up to grade four with learning problems who were in individualized programs achieved as well as the average norm-group students. Fisher (1973) found that a computer instruction curriculum and a traditional curriculum were equally effective in producing achievement gains in grade eleven geometry. Horvath (1976), Loucks (1976) and Yomtoob (1975) concluded that the type of instruction, individualized or non-individualized, did not, in general, affect arithmetic achievement. Ellis (1976), Krammin (1976), MacIntosh (1976), Sherry (1975) and Mayfield (1974) all found no significant achievement difference between groups taught by individualized or traditional methods. Likewise, Nixon (1976), Wheaton (1972), Wendt (1975), Stone (1975), Bowen (1974), Corbin (1974) and Drum (1974) concluded that there was no significant difference in

achievement between groups using an individualized approach to mathematics instruction and those using a traditional approach. Edwards (1975), Penner (1972), Shumaker (1973) and Thomas (1972) also concluded that there was no significant difference in mathematics achievement between students using self-paced instruction and those using conventional instruction. Bazik (1973) found no significant differences between prospective elementary school teachers who used self-paced materials with explicit objectives and a smaller group having traditional instruction. Similarly, Chick (1975) found no significant differences in achievement in grade five geometry between groups trained or not trained in using behavioral objectives. Nelson (1975) stated that there was no significant difference in mathematics achievement between students (pre-service teachers) working individually or in pairs.

As can be seen, many researchers have made many different conclusions regarding achievement and individualized instruction. Eshiwani (1975) stated that the use of programmed materials was effective in terms of achievement for teaching probability to high school students. Fernandez (1972) said that students in grade nine using an individualized program in algebra achieved satisfactorily when judged by national norms. Burnight (1975) found that seventh-grade students using an individualized mathematics program made a significant gain in achievement. Peluso and Baranchik (1977) concluded that self-paced instruction appeared to have a leveling effect on course achievement in college mathematics. As a result of all these findings, it is concluded that individualized instruction is valuable as a means of increasing achievement in mathematics.

Cost

The cost factors involved with the introduction of any new program are always of concern to educators, and to administrators in particular. LaPlaca (1973) found that the "operational cost-effectiveness factor" for individualized instruction was one and one-half times that for traditional instruction. However, Baley and Benesch (1969) stated that individualized instruction cost no more than traditional methods of instruction.

Since the available data on this topic is so limited, it is difficult to make conclusions with any great degree of certainty. More research is needed in the area. However, one must be careful in condemning a new program simply because it costs more. It might well be worth the extra expenditure if student achievement and learning levels are raised. As can readily be seen, cost analysis is a complex task that must not be taken lightly.

General

There are many other aspects of individualized instruction that must be considered. Past research has examined many of them and has made numerous observations and recommendations for the future. Bull (1971) recommended that membership in individualized programs be voluntary. Taylor (1972) recommended that such programs be used with students who are highly motivated to learn on their own.

Heiman (1971) stated that student performance rate increased more when teachers had feedback on pupils' success in an individualized instruction program in mathematics in elementary school. Smith (1976) concluded that features of mastery learning and individual

pacing could be incorporated in an instructional system that provides superior performance in college mathematics. Similarly, Hagan (1977) found that an individualized program was successful in helping tenth-grade geometry students attain mastery.

Analyses of individualized instruction were also conducted by several researchers. Eveland (1975) cited the beneficial aspects of IPI, such as the opportunity for teachers to work with individuals or small groups, and the least desirable aspects, such as the inability of pupils to cope with the program. Karmos (1975) considered the strengths of the IPI program to be student attitudes and individualization. He considered the weak points to be development of skills, lack of manipulatives and audiovisual aids, and cost. Kerrigan (1976) concluded that the individualized learning system approach was a "viable alternative" to the traditional approach.

SUMMARY AND CONCLUSION

The amount of available materials concerning individualized instruction is indeed voluminous. After reviewing and examining a great deal of this material, it was concluded that such instruction is a practical and justifiable alternative to the instructional methods presently being used. Individualized instruction holds great promise for the future. However, more research is needed before educators are able to fully accept it.

If it can be demonstrated that individualized instruction is a successful means of instruction in the Beauty Culture program, then it is hoped that other programs at the College of Trades and Technology might investigate the possibility of using the individualized

method. In this way, the overall effectiveness and success of instruction will be improved, and hence students will be better able to achieve their specific goals for each course. It is to this end that this particular study was carried out.

CHAPTER III

METHOD AND EVALUATION PROCEDURE

The problem examined in this study was as follows: Is individualized instruction a successful method for post-secondary students at the College of Trades and Technology to achieve specified objectives in mathematics? Individualized instruction has been defined in Chapter II and the definition expounded by Larsson (1973) has been accepted. Whether or not the instruction was successful will be discussed later.

Sample

The post-secondary students used in this study were 12 students enrolled in the Beauty Culture apprenticeship program. They had completed a pre-employment course, usually of 9 months duration, and then had returned for 8 weeks further training after working a minimum of 2000 hours (50 weeks at 40 hours per week) in the Beauty Culture field. It was during this 8 week course that the instruction in mathematics was individualized.

For the 12 students used in this study, the work experience ranged from 50 weeks to 200 weeks. The average was approximately 70 weeks.

Materials

The course was divided into seven major topics with each topic comprising one module. These modules had the following titles: Whole Numbers, Fractions, Decimals, Percent, Personal Finances, Basic Accounting and Banking Procedures, and Insurance. Each module was divided further into a number of smaller sections. For example, Module 1 on Whole Numbers contained five distinct sections--namely,

addition of whole numbers, subtraction of whole numbers, making change, multiplication of whole numbers, and division of whole numbers. The seven modules are included in Appendices A to G.

Short, formative examinations were completed by the students after they had completed one or more sections of each module. These examinations were self-administered and self-checked by comparing answers with those in a prepared answer binder. That is, it was the responsibility of the students to ensure that they wrote the appropriate formative examinations and also kept records of the results, using the Student Evaluation Record "A" forms. A copy of this form can be found in Appendix H. If the students achieved 70% on an examination, they continued on with the rest of the module. However, if they failed to meet the 70% criterion, then they consulted with the instructor who provided some individual, personal help. If the students did not achieve 70% on the second writing of the examination, then they recorded the mark obtained and continued on with the remainder of the module.

A similar procedure was followed with regard to the longer, summative examination at the end of the module, except for two important differences. First, this examination was administered, corrected, and the result recorded by the instructor and not by the students. This was done using the Student Evaluation Record "B" form, a copy of which is included in Appendix I. Second, the students had to achieve 75% in order to be considered as having mastered the module. Again, however, the students were given only two opportunities to attain mastery. If this level was not reached after two attempts, then the students moved on to the next module anyway.

As an example of this procedure, consider the previously mentioned Module 1. The students wrote a short formative examination at the end of each of the five sections, and a longer summative examination when a 70% achievement was recorded on each of the five formative examinations or the student had been given two opportunities to attain this score of 70%. Strict control was maintained over a student's progress through the module, and hence through the course. Before students could proceed to Module 2; they must have attained mastery on the summative examination or else have exhausted their two attempts at doing so.

Evaluation

To determine whether or not the instruction was successful, it was necessary to examine the test results. The instruction was considered as being successful for each module if 80% of the students achieved mastery by scoring 75% or more on the first writing of the posttest. If less than 80% achieved mastery the first time, the instruction was deemed to have failed somewhere along the line. The module associated with the topic was then carefully analyzed and the problem located. In this way, the program was under constant evaluation and revision when necessary. This evaluative process was used to make the instructional method more effective. As a result, it was vital to follow some evaluation model.

According to Webb (1970), evaluation is a process of collecting and processing data pertaining to an educational program on the basis of which decisions can be made about that program. This definition parallels the type of evaluation carried out in this study.

Eiss (1970) stated that evaluation should "permeate" the entire system and not be left until the conclusion of the process to be brought into use. Again, this aspect of evaluation was followed. Taba (1962) said that a function of evaluation was "to provide information on the strengths and weaknesses of the program by assessing the strengths and weaknesses in the achievement of pupils" (p. 315). This implies continuous refinement, as was the case in this study. Stufflebeam (1971) concluded that evaluation is "the science of providing information through formal means such as criteria, measurement, and statistics for decision making" (p. 19). He considered evaluation to be the process of acquiring and using information for making decisions associated with "planning, programming, implementing and recycling program activities" (p. 20). Tyler (1950) defined evaluation as "a process for determining to what extent the educational objectives of a learning experience have been developed and organized as to produce a desired result" (p. 105). He went on to say that evaluation must be an on-going process so that it can "offer any relevant improvements" (p. 106).

The evaluation model on which this study was based, however, was the one put forth by Stake (1967). Stake's evaluation model is presented in Figure 1. He defined formative evaluation as that which "takes place during the developmental stages of curriculum" (p. 538). He called this the "developer-author-publisher criteria" (p. 538). The rationale for using this model was that it provided a basis for evaluating "intents." Stake defined "intents" as a priority listing of all that may happen. It includes the planned-for environmental conditions, the planned-for demonstrations, the planned-for coverage

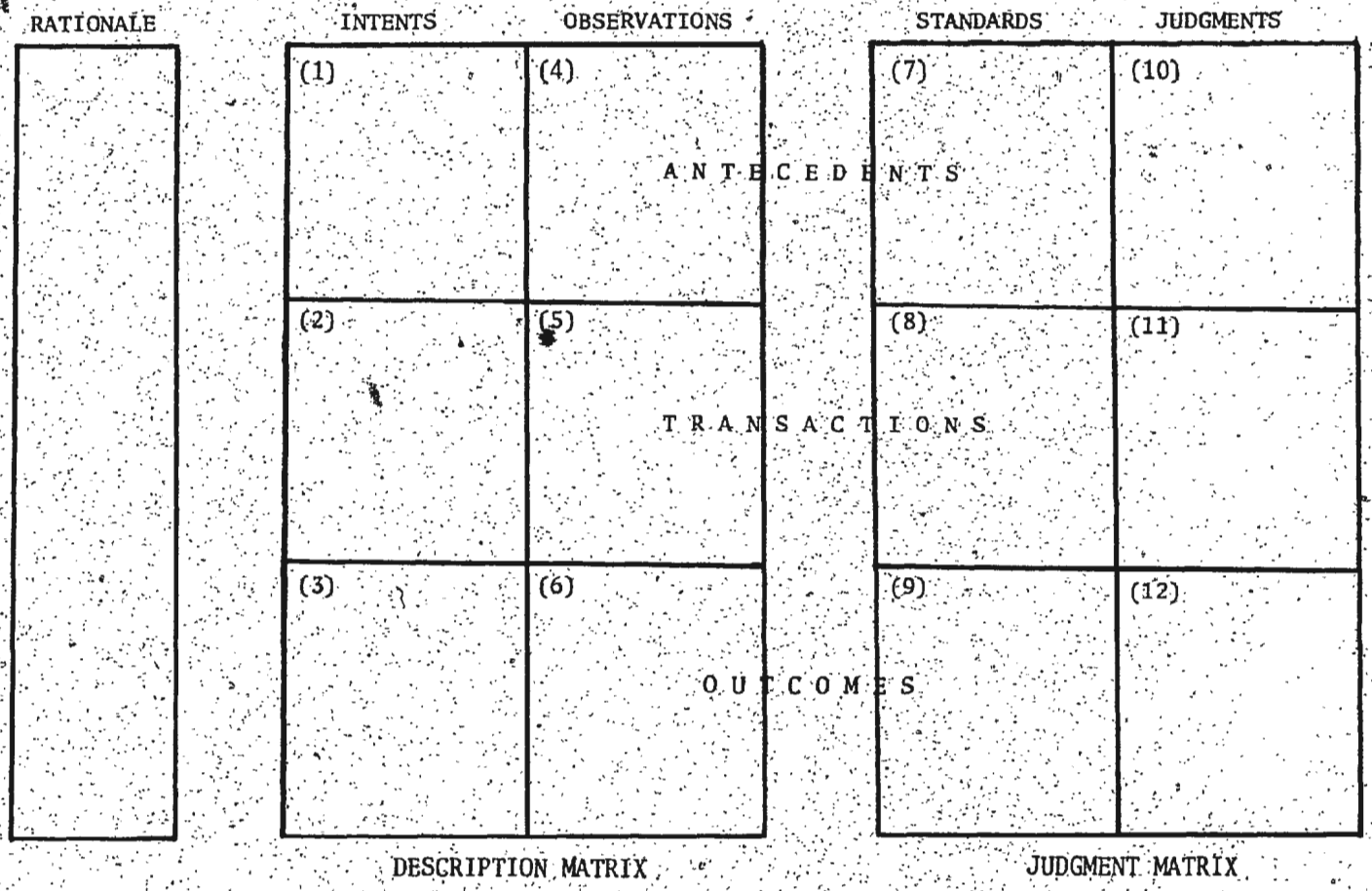

FIGURE 1: Stake's Evaluation Model

of certain subject matter, mathematics in this study, as well as the planned-for student behavior. Under the heading of "intents" the model also includes effects desired, effects hoped for, and effects anticipated. This class of data includes goals and plans that others have, especially the students.

Stake also examined various other terms in his model. He defined "antecedents" as conditions existing prior to teaching and learning which may relate to outcomes. He defined "transactions" as the "countless encounters of students with teachers, students with students, author with reader, and parent with counsellor" (p. 528).

Stake went on to describe "outcomes" as the measurement of the "impact of instruction" on teachers, administrators, counsellors and others. Included in this would be data on wear and tear of equipment, effects of the learning environment, and the cost incurred. He also considered "outcomes" in the traditional way--outcomes such as the abilities, achievement, attitude and aspirations of students resulting from an educational experience. In addition, he considered "outcomes" not readily evident at the end of a learning experience, such as applications, transfer and relearning effects which can only be measured after a long time.

Stake also defined two types of standards: (1) absolute standards, reflected by personal judgment, and (2) relative standards, reflected by characteristics of alternate programs. He continued by defining a "descriptive matrix" as "a description of pupil achievement, instruction and relationships between them" (p. 528). As understood in the model it would include antecedent intents, antecedent observations, transactional intents, transactional observations, outcome

intents and outcome observations.

Stake then defined a "judgment matrix" as a "judgment on the characteristics of a program" (p. 535). This judging would be done on the basis of congruency of observations and intents in addition to observations and standards. He went on to describe "congruence" as being a part of formative evaluation. The data for a curriculum are congruent if what was intended actually happens. To be fully congruent the intended antecedents, transactions, and outcomes would all have to come to pass.

Stake, in trying to clarify his model, gave an illustration of 12 pieces of data, one of which could be recorded in each of the 12 cells as indicated in Figure 1. The data were as follows: "Knowing that (1) Chapter XI has been assigned and that he intends (2) to lecture on the topic Wednesday, a professor indicates (3) what the students should be able to do by Friday, partly by writing a quiz on the topic. He observes (4) some students were absent on Wednesday, that (5) he did not quite complete the lecture because of a lengthy discussion and that (6) on the quiz only about two-thirds of the class seemed to understand a certain major concept. In general he expects (7) some absences but that the work will be made up by quiz-time; he expects (8) his lectures to be clear enough to be understood by ninety percent of the class; and he knows that (9) his colleagues expect only about one student in ten to understand thoroughly each major concept in such lessons as these. By his own judgment (10) the reading assignment was not sufficient background for his lecture; and the students commented that (11) the lecture was provocative; and the graduate assistant who read the quiz papers

said that (12) a discouragingly large number of students seemed to confuse one major concept for another" (p. 530).

THE FUNCTION OF THE INSTRUMENTS IN STAKE'S MODEL

Introduction

Stake's evaluation model consists of two matrices. The descriptive matrix contains the intents column and the observations column. The intents were outlined before the study was started while the observations were recorded at the end. The judgment matrix also contains two columns, one listing standards and the other judgments. The standards, like the intents, were established before the study was begun. The judgments were rendered after the other three columns were completed.

The Descriptive Matrix

Intents column: This column was completed using the statements of intent contained in the course outline for Beauty Culture apprenticeship mathematics in use during the 1980-81 school year. A list of the statements and data in the model are presented in Figure 2.

The antecedent intents have already been described in terms of the students, the curriculum, and the materials and facilities. The transactional intents, dealing with instructional activities and time allocation, have also been discussed. The outcome intents were listed as the following: (1) at least 80% of the students would achieve 75% or more on the first writing of the final examination for each module; (2) at least 90% of the students would complete all seven modules. These two outcome intents were based on the expectations and intentions of the investigator.

RATIONALE	INTENTS	OBSERVATIONS	STANDARDS	JUDGMENTS
	1. The Beauty Culture students 2. Nature of mathematics curriculum 3. Instructional materials and facilities	ANTECEDENTS		
	1. Instructional activities 2. Time allocation	TRANSACTIONS		
	1. Achievement on first writing of final exam for each module. 2. Students completing all seven modules.	OUTCOMES		
	DESCRIPTION MATRIX		JUDGMENT MATRIX	

FIGURE 2: A Layout of the Intents Inserted in Stake's Evaluation Model.

Observations column: Observational data were obtained mainly by examining the scores obtained by the students on a number of formative and summative examinations. Some of the material in this column consisted of visual observations made by the investigator over the course of the study. These data were then classified and recorded as antecedents, transactions, and outcomes. "Observed outcomes" were focused on the number of students who achieved 75% on the first writing of the final examination for each module and on the number of students who completed all seven modules.

The Judgment Matrix

Standards column: Standards were established by recording expectations as expressed by the trade theory (Beauty Culture) instructors, by a mathematics instructor who was using an individualized program with a similar group of students, and by the investigator who was the mathematics instructor for the students in the study. A list of the standards inserted in the model is presented in Figure 3. These were absolute standards since they were reflections of personal judgments. First of all, the antecedent standards were defined as the following: (1) the students were Beauty Culture apprenticeship students, most of whom had completed a 9 month training course and had been working for 1 year; (2) the mathematics curriculum was based on the Beauty Culture profession, with as much emphasis as possible on the mathematics necessary to understand basic business practices; (3) the course was composed of seven separate modules--Whole Numbers, Fractions, Decimals, Percent, Personal Finances, Basic Accounting and Banking Procedures, and Insurance; the course was conducted in an ordinary classroom.

Second, the transactional standards were listed as the follow-

RATIONALE	INTENTS	OBSERVATIONS	STANDARDS	JUDGMENTS
		ANTECEDENTS	1. Beauty Culture apprenticeship students 2. Mathematics curriculum based on Beauty Culture profession. 3. Seven modules with work done in ordinary classroom.	
		TRANSACTIONS	1. Individualized instruction 2. Two hours per week for 8 weeks; extra 2 hours per week.	
		OUTCOMES	1. Fifty percent of students achieve 75% on first writing of final exam for each module; 75% to 80% on second writing. 2. Eighty percent of students complete all seven modules.	

DESCRIPTION MATRIX JUDGMENT MATRIX

FIGURE 3: A Layout of the Standards Inserted in Stake's Evaluation Model.

ing: (1) the instructional activity (methodology) used was individualized instruction; (2) the course was conducted for 2 hours per week for 8 weeks. Also, students were expected to spend at least an additional 2 hours each week on the course materials.

Finally, the outcome standards were described as follows: (1) upon consultation with the Beauty Culture trade instructors and a mathematics instructor presently using individualized instruction with a similar group of students (barber/stylists), it was expected that 50% of the students who completed each module would achieve 75% on the first writing of the final examinations and that 75% to 80% would achieve 75% on the second writing; (2) after similar consultation, it was expected that 80% of the students would complete all seven modules.

Judgment column: Judgment was rendered by the investigator. In each instance, this judgment was a decision concerned with the relative congruence of observations and intents as well as observations and standards. An overall judgment of the merit and worth of the mathematics program was also given. Details of these decisions and how they were made are contained in Chapter IV.

CHAPTER IV

CONGRUENCE ANALYSIS

Introduction

This chapter is divided into three major parts. The first part deals with the antecedent variables, the second part with the transactional variables, and the third part with the outcome variables. Under each heading congruence was examined between the observations and intents and between the observations and standards. A conclusion was then drawn with regard to this congruence.

Antecedent Variables

The Beauty Culture Students

It was observed that there were 12 students in the class. All 12 were female, with the average age being 22.8 years. Eight students (67%) had previously completed a 9 month training course, while the remaining four (33%) had been enrolled in only a 3 month course. Eleven students (92%) had been employed for periods ranging from 1 to 1½ years, while one student had been employed for 4 years. The standard defined the students as Beauty Culture apprenticeship students, most of whom had completed a 9 month training course and had been working for 1 year.

It may be concluded that there was congruence between what was observed and what was intended. In addition, congruence existed between the observations and the defined standard.

The Nature of the Mathematics Curriculum

It was observed that the mathematics being offered the students was directly related to the Beauty Culture field. All seven topics were deemed necessary in order to be successful cosmeticians, especially if they were operating their own business. Also, the wording of each problem in each module was based on a typical situation which might arise in such a business. The standard stated that the mathematics curriculum was based on the Beauty Culture profession, with as much emphasis as possible on the mathematics necessary to understand basic business practices.

The conclusions reached here were that what was observed was congruent with what was intended and what was observed was also congruent with the defined standard.

Instructional Materials and Facilities

The instructional materials used in the study were seven modules - Whole Numbers, Fractions, Decimals, Percent, Personal Finances, Basic Accounting and Banking Prodedures, and Insurance. Each of these modules was developed and refined by the investigator. In addition, 52 formative examinations, 14 summative examinations, solutions to each examination, and solutions to each exercise were devised to be used in conjunction with these modules. A copy of each formative examination is contained in Appendix J, Appendix K contains a copy of each summative examination, Appendix L contains the solutions to the formative examinations, Appendix M contains the solutions to the summative examinations, and Appendix N contains the solutions to the exercises. There were also several mathematics reference books to which the

students could refer when the need arose. It was observed that the facilities consisted of an ordinary classroom with individual student desks. One row of desks was arbitrarily designated as the "testing row" and the students were permitted to sit in any other location in the room.

The standard stated that the course was composed of seven separate modules, having the same titles as those that were observed. The standard also stated that the course was conducted in an ordinary classroom.

It was concluded that the observations and intents were congruent. In addition, what was observed was concluded to be congruent with the established standard.

Transactional Variables

Instructional Activities

The instructional methodology used in the study was individualized instruction. The students worked through each self-contained module at their own pace. The instructor acted as a resource person; that is, the instructor became someone to whom the students could turn when they had difficulty with a certain topic. The instructor also corrected the final examination for each module, in addition to the duties of maintaining a record of each student's progress through the course. The standard stated that the instructional activity (methodology) used was individualized instruction.

It was concluded that what was observed was congruent with what was intended and that what was observed was also congruent with the stated standard.

Time Allocation

It was observed that the students were scheduled to attend mathematics class for one 2 hour class per week over an 8 week period. This meant that each student could receive a maximum of 16 hours of "instruction." From Table 1 it can be seen that 84% of the students were absent for 2 hours or less, and no student was absent for more than 6 hours. It was also observed that most of the students appeared to be working on the modules outside of class-time. This observation was subjective and virtually impossible to prove. The instructor could only rely on statements made by the students and on the speed with which they progressed through the course. The standard stated that the course was conducted for 2 hours per week for 8 weeks. The standard went on to say that the students were expected to spend at least an additional 2 hours each week on the course materials.

It was concluded that there was congruence between what was observed and what was intended. In addition, there was congruence between the observations and the established standard.

Table 1

Student Absenteeism Data

	Number of hours absent				
	0	2	4	6	more than 6
Number of students	3	7	1	1	0
Percent of students	25	59	8	8	0

Outcome Variables

Success on First Writing of Final Examination

It was intended that at least 80% of the students would achieve 75% or more on the first writing of the final examination for each module. It was observed that 100% of the students succeeded on the first writing of the final examination in Module 1, 100% in Module 2, 83% in Module 3, 92% in Module 4, 70% in Module 5, 75% in Module 6 and 75% in Module 7. Since not all of the students completed Modules 5, 6 and 7, the percentages cited for these modules are based on the number of students that did complete each module and not on the number of students in the class.

In Table 2 the number of students who attained a score of 75% on their first attempt is presented, as well as those who attained a score of 75% on their second attempt. These numbers are also expressed as a percent of the total number of students who were in the study. It can be seen that 10 students completed Module 5, but only seven of these attained mastery on the first attempt. These seven students, therefore, represented 58% of the students in the class and 70% of the students who completed Module 5. It is also indicated that the 75% who succeeded on the first writing in Modules 6 and 7 constituted 50% of the total class.

Table 2

Achievement on Summative Examinations

Module	Number (percent) attaining mastery on first attempt	Number (percent) attaining mastery on second attempt	Number not attaining mastery after two attempts	Number (percent) completing module
1	12 (100%)	-	0	12 (100%)
2	12 (100%)	-	0	12 (100%)
3	10 (83%)	2 (17%)	0	12 (100%)
4	11 (92%)	1 (8%)	0	12 (100%)
5	7 (58%)	3 (25%)	0	10 (83%)
6	6 (50%)	2 (17%)	0	8 (67%)
7	6 (50%)	2 (17%)	0	8 (67%)

It was noted that all of those students who failed to achieve 75% or more on the first attempt were successful the second time. That is, 100% of the students succeeded after the second writing. Once again this percentage refers not to the number of students in the class, but to the number of students who completed each module.

The standard stated that it was expected 50% of the students who completed each module would achieve 75% on the first writing of the final examinations. The standard went on to say that 75% to 80% were expected to attain a score of 75% on the second writing.

It was concluded that there was congruence between what was observed and what was intended for the first four modules only. The students did not achieve as well as was intended in the final three modules. With regard to observations and the established standard,

congruence was concluded since the results observed exceeded the standard.

Number of Students Completing All Modules

It was intended that at least 90% of the students would complete all seven modules. The standard stated that it was expected 80% of the students would complete all seven modules. It was observed, as can be seen in Table 1, that 100% of the students completed the first four modules, 83% completed up to Module 5, 67% completed up to Module 6, and 67% completed up to Module 7. That is, it was observed that only 67% of the students completed all seven modules.

The conclusions reached here were that congruence did not exist between the observations and the intents, and also the observations were not congruent with the defined standard.

CHAPTER V

JUDGMENT AND CONCLUSIONS

Introduction

This final chapter is comprised of three parts. In the first section, a summary of the study is presented. Included is a brief description of the most important aspects, as well as a discussion of the evaluation model used. The second section contains a summary of the results and a brief discussion of each. The results are described in terms of antecedent variables, transactional variables, and outcome variables. In the final section, the implications for the study are drawn. In addition several recommendations for the future are presented.

Summary of Study

The problem examined in this study was as follows: Is individualized instruction a successful method for post-secondary students at the College of Trades and Technology to achieve specified objectives in mathematics? The definition of individualized instruction given by Larsson (1973) was accepted as the ideal situation for which educators should strive. This definition had five main points: (1) the work of each pupil is directed at achieving a goal that is adapted to his particular ability and interests; (2) instructions are given to one pupil at a time; (3) the number of tasks and their degree of difficulty vary from pupil to pupil; (4) each pupil works at his own rate and with methods and material that suit his ability; and (5) the teacher evaluates the work of each pupil on the basis of the pupil's ability.

The post-secondary students used in the study were 12 Beauty Culture apprenticeship students. They had completed a pre-employment course and had returned for a further 8 week course after working for a minimum of 1 year.

The course was divided into seven modules--Whole Numbers, Fractions, Decimals, Percent, Personal Finances, Basic Accounting and Banking Procedures, and Insurance. Each of these self-contained modules was developed by the investigator.

Short, formative examinations were written after the students had completed one or more of the sections into which each module was sub-divided. These examinations were self-administered and corrected by the students with the answer keys provided. They then recorded the results on a special form. The students were given two opportunities to achieve 70% on each section before they proceeded to the next.

At the end of each module, the students wrote a longer, summative examination. This examination was administered, scored, and recorded by the instructor. The students were afforded two attempts at achieving 75% before moving on to the next module.

The evaluation model on which the study was based was the one put forth by Stake (1967) and described in greater detail in Chapter III. The intents and standards were determined for the antecedent, transactional, and outcome variables prior to the collection of data. These are also described in detail in Chapter III.

After the students had completed the program, the "observations" column in Stake's model was compiled. The information for this column consisted mainly of the results obtained on the formative and summative examinations. The observed outcomes were concerned for the most part with the number of students succeeding on the first attempt at each summative examination and with the number of students completing all the modules.

Judgments were then made with regard to congruence between observations and intents and between observations and standards. With this information, an overall judgment of the mathematics program could be put forth.

Summary of Results

Antecedent Variables: With regard to the Beauty Culture students, it was concluded that what was observed was congruent with what was intended and with the defined standard. This was to be expected since the course was offered for a particular, well-defined group of students. Thus, the students were observed as being the type of students who were intended, as well as expected, to be in the class.

The mathematics curriculum was observed to be congruent with what was intended and with the defined standard. Again, this was to be expected since the course was devised especially for this study.

With regard to instructional materials and facilities, congruence was also concluded between the observations and the intents and between the observations and the established standard. This was anticipated since the materials, consisting of seven modules, 52 formative examinations and 14 summative examinations, were developed

by the investigator specifically for this study. The facilities were observed to be an ordinary classroom, which was what was intended and expected.

Transactional Variables: The instructional activities observed in the study were concluded to be congruent with what was intended and with the stated standard. The instructional methodology used was individualized instruction, which was the methodology intended and expected.

With regard to time allocation, it was concluded that the observations were congruent with the intention and with the established standard. It was observed that 84% of the students were absent for 2 hours or less of the total possible 16 hours. In addition it was observed that most of the students appeared to be doing extra work outside of class. These observations were congruent with what was intended. Also, the observations were congruent with the standard, which stated that the course was to be conducted for a total of 16 hours and that students were expected to spend an additional 16 hours working on the material on their own. The observation dealing with these additional 16 hours was subjective and could not be proven. However, it was the opinion of the investigator that this extra time was being spent working on the modules. This conclusion was based on comments made by the students, the ease with which many of them worked through the material, and the speed with which many of them completed all seven modules.

Outcome Variables: With regard to success on the first writing of the final examination, it was concluded that the observations were congruent with the intention for the first four modules only. It

was also concluded that the observations were congruent with the established standard for all seven modules. It was intended that 80% of the students would achieve 75% or more on the first writing of the final examination for each module. The standard stated that 50% of the students who completed each module were expected to achieve 75% on the first writing and that 75% to 80% were expected to succeed on the second writing.

It was observed that 100% of the students attained a score of 75% on the first writing of the final examinations in Modules 1 and 2, 83% did so in Module 3, 92% in Module 4, 70% in Module 5, and 75% in Modules 6 and 7. In addition, it was noted that no student failed to achieve 75% after exhausting both attempts at doing so.

From these observations, the previously mentioned conclusions dealing with congruence were determined. That is, what was observed was congruent with what was intended for the first four modules, and what was observed was congruent with what was defined as the standard for all seven modules. It was felt that the reason why the observations and intentions were not congruent for all seven modules was that too much was intended. That is, it was intended that 80% would succeed on the first writing, but it was felt at the end of the study that this figure was too high and that probably a figure similar to the stated standard of 50% would have been more realistic.

The second outcome variable dealt with the number of students completing all the modules. It was intended that at least 90% of the students would complete all seven modules. The standard stated that 80% of the students were expected to complete all seven.

It was observed that 100% of the students completed up to Module 4, 83% up to Module 5, 67% up to Module 6 and 67% up to Module 7. What this meant was that only 67% of the students completed all seven modules. Thus, it was concluded that congruence did not exist between the observations and the intentions, nor did it exist between the observations and the established standard. It was felt that the main reason for these incongruencies was that the students were generally spending more time on Modules 1 and 2, in particular, than was really necessary. After checking with the students, it was discovered that they were doing all the exercises in the two modules. As a result, valuable time was consumed in doing work that was unnecessary for many students. One way to overcome this might be to incorporate pretests into each module and to allow students to jump modules if performance was satisfactory.

Implications and Recommendations

At the end of the study it was concluded that individualized instruction appeared to be a workable instructional methodology for post-secondary students. The program proceeded smoothly with the students encountering very little difficulty with the "process." That is, they seemed to adapt to this new procedure with a minimum of problems. There were probably various reasons for this, but it was felt that a major contributing factor was the relative maturity, with regard to age, of the group. The students ranged in age from 18 to 43, with the mean being 22.8 years. It was also felt that the 43 year old student added a certain amount of stability to the class as a whole. The other students, especially the younger ones,

respected her opinion and looked to her for leadership. Since she was a "good" student, it was felt that the others became better students in trying to follow her example.

A disadvantage of this type of program surfaced during the course of the study. This disadvantage dealt with the increased record-keeping required of the instructor. Seven separate forms were maintained for each student in addition to the regular duties of correcting all summative examinations and providing individual assistance when needed. This resulted in a heavy demand on the instructor during classroom time. It was felt imperative that the instructor be well organized or else the students would soon become confused and not easily motivated.

Taking all factors into consideration, it was concluded that individualized instruction was a successful method for post-secondary students (Beauty Culture apprentices) at the College of Trades and Technology to achieve specified objectives in mathematics. This judgment was based on the data included in Stake's evaluation model. That is, it was based on the congruencies between observations and intents and between observations and standards with regard to antecedent, transactional, and outcome variables.

Several recommendations can be made based on the results. The following recommendations were based on the observations made during the study:

1. It is recommended that the outcome intent dealing with the number of students succeeding on the first writing of the summative examinations be more flexible. Since success on the first writing ranged from 50% to 100%, different expectations should be set

for each module.

2. It is recommended that students be instructed to spend only as much time as necessary working on a module, especially Modules 1 and 2. It was decided that most students need not do every problem in each exercise, but might consider doing only every second or third problem. In this way, valuable time would not be devoted to the early, easier modules at the expense of the later modules.

3. It is recommended that instructors utilizing an individualized instruction methodology be provided with an assistant, at least part-time. Such a person was deemed necessary in order to deal with the numerous clerical duties which must be performed. Some of these duties include recording of examination results, reproducing copies of examinations, filing modules and examinations, disposing of completed examinations and maintaining supplies of reference materials.

4. It is recommended that courses adopting individualized instruction be limited to a maximum of 15 students. It was felt that an instructor could not adequately cope with a class size any larger. Individualized instruction, by combining several classes into one, could not be regarded as a less expensive way of presenting material. It was considered that a pupil-teacher ratio of 15:1 was a maximum for effective teaching and learning. This ratio could be increased only if the services of an assistant were provided.

5. It is recommended that the feasibility of individualized instruction be investigated in other courses and with other students. In

this way the results of this study could be verified or disputed. Only after such expansion has occurred could a decision regarding the overall effectiveness of the method be made.

6. It is recommended that the feasibility of computerizing the various examination procedures be studied. These procedures would include administering and processing the examinations as well as recording the results. It is recognized that one or two computer terminals could easily service the average-size apprenticeship class. It is conceivable that in the future the material in the modules will be on computer and the students will use a terminal rather than a written module. A great advantage of this method is that it would be a convenient and efficient way to update and revise course material. If the modules, examinations, and records were computerized, it is possible that the previously mentioned pupil-teacher ratio of 15:1 could be increased. It was felt, however, that computer-assisted instruction should be studied in greater detail before such steps are taken.

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APPENDIX A

Module 1--Whole Numbers

MODULE 1

MATHEMATICS FOR

BEAUTY CULTURE APPRENTICES

WHOLE NUMBERS

Objectives

Upon successful completion of this module you will be able to:

1. Add, subtract, multiply and divide whole numbers.
2. Make change for common monetary transactions in a beauty salon.
3. Apply whole numbers to activities in daily life.
4. Apply whole numbers to activities in beauty salons.

Materials

1. Notebook, pen or pencil.

References

1. Mathematics of Business
2. Business and Consumer Mathematics
3. Refresher Mathematics



Instructions

1. Carefully read and study the material contained in each section.
2. Solve (correctly) all problems given in each section before moving on.
3. When you encounter difficulty in solving a problem, please consult with your instructor.
4. At the appropriate places (as noted in the module) ask your instructor for the required (formative) exam. You are to correct this exam yourself and record the result and the date on the Student Evaluation Record "A". If you fail to score 70% on the exam, then you are to consult with your instructor who will provide you with additional help before you write a second (and final) exam on the material.
5. After you have completed the entire module, ask your instructor for the final (summative) examination on the whole module. If you do not achieve 75% on this examination, then you are to again consult with your instructor who will provide you with additional help. As with the formative exams, you are given only two opportunities to score 75%. If you fail to do so in both attempts, then you will move on to the next module anyway.

SECTION A

ADDITION OF WHOLE NUMBERS

Explanation: The process of combining two or more numbers and expressing the result as a single number is called addition. Each number is called an addend, and the result is called the sum.

Example 1:

```
 6438 - addend
 4957 - addend
11395 - sum
```

Example 2:

```
 6215
  346
 7980   addends
  409
 3658
18608 - sum
```

There are two main methods for checking your answer.

Method 1: Add the columns of figures from top to bottom and then add them from bottom to top.

Method 2: Add each column separately and arrange the totals as shown below.

```
 345        Third Column Total ..... 20
 627        Second Column Total .....16
 812        First Column Total ..... 20
 396                                 2180
2180
```

Exercise 1

Add each of the following:

1. 9 / 7 / 5 / 8

2. 15 / 18 / 11 / 16

3. 76 / 85 / 24 / 36 / 58

4. 396 / 415 / 927 / 240 / 761

5. $ 468.15 / 75.22 / 249.36 / 2612.95 / 404.31

6. 415 986 / 625 543 / 869 510 / 902 421

7. 3 562 489 / 4 109 563 / 84 999 / 875 / 263 642

Exercise 2 - Problems

1. Miss Smith's daily services amounted to the following: Monday - $110.00, Tuesday - $112.10, Wednesday - $165.50, Thursday - $154.80, Friday - $210.40. How much did Miss Smith take in for services for the week?

2. Miss Cooper sold the following cosmetics in March: first week - $20.50, second week - $18.35, third week - $42.90, fourth week - $52.00. Find the monthly total.

3. Miss Snow's services for the day were as follows: hair lightening - $50.00, brow arch - $2.00, hair cuts - $20.00 scalp treatment - $20.00, shampoos and blow drys - $60.00. Find the total amount.

4. Miss Brown made the following cash payments:
window cleaner - $12.00, express - $8.20, cleaning supplies - $15.25, hair tints - $42.35, permanent wave solutions - $42.00. How much money did she pay out?

5. Miss Brown wrote cheques for the following items:
rent - $450.00, electricity - $96.80, equipment - $75.25, supplies - $115.75, sales tax - $55.20. How much was paid by cheque?

ASK YOUR INSTRUCTOR FOR

EXAM 1 on Section A OF

MODULE 1.

SECTION B

SUBTRACTION OF WHOLE NUMBERS

Explanation: The process of finding the excess of one number over another is called subtraction. The number from which we subtract is called the minuend, and the number subtracted is called the subtrahend. The result or difference obtained is called the difference or remainder.

Example: 829 - minuend
256 - subtrahend
573 - difference (remainder)

To check the answer in subtraction we add the difference (remainder) to the subtrahend. The resulting number should be the minuend. From the example above we see that 573 (the difference) added to 256 (the subtrahend) gives 829 (the minuend). This proves that our answer is correct.

Exercise

Subtract each of the following:

1. $\begin{array}{r} 68 \\ -59 \end{array}$

2. $\begin{array}{r} 128 \\ -79 \end{array}$

3. $\begin{array}{r} 562 \\ -318 \end{array}$

4. $\begin{array}{r} 2910 \\ -237 \end{array}$

5. $\begin{array}{r} 4967 \\ -2068 \end{array}$

6. $\begin{array}{r} 35\,218 \\ -29\,509 \end{array}$

7. $\begin{array}{r} 4\,093\,251 \\ -1\,865\,793 \end{array}$

8. $\begin{array}{r} 412\,430 \\ -89\,265 \end{array}$

ASK YOUR INSTRUCTOR FOR

EXAM 1 ON SECTION B OF

MODULE 1.

SECTION C

MAKING CHANGE

Explanation: When giving change to a customer, the "Austrian Method" is most often used. Instead of subtracting the amount owed from the coin or bill given, the amount of the purchase is added to the next higher money unit, then to the next and so on until the amount of the coin or bill is reached.

Example: If a customer's bill amounts to $17.20 and she gives $20.00 in payment, the cashier should make the change in the following way: 5 cents (one nickel) to make the sum of $17.25; then 75 cents (3 quarters) to make $18.00; then one 2 dollar bill to complete the total of $20.00.

Exercise - Problems

1. Miss Howell presented her client with a check listing the following services: shampoo and blow dry - $12.50, manicure - $8.25, scalp treatment - $10.75.
   (a) Find the total amount of the check.
   (b) The client pays with a $50.00 bill. Using the "Austrian Method" explain how Miss Howell makes the change.
   (c) How much change does the client receive from her $50.00?

2. Miss Jones paid $113.75 for an order of cosmetics. She made a profit of $64.37 on the order.
   (a) How much did she receive for the cosmetics?
   (b) She paid for the order with two $100.00 bills. How much change did she receive?
   (c) Count out the change she received.

3. Mrs. English had the following services performed:
manicure - $8.25, shampoo and blow dry - $12.00, and hair cut - $15.25.

(a) What would be her total check if she treated her daughter to the same services?

(b) Mrs. English paid the check with a $100.00 bill. How much change did she receive?

(c) How should it be counted out?

4. Miss White had services amounting to $14.75. She bought a bottle of shampoo for $2.50, a hair brush for $4.20, and a jar of hair conditioner for $3.85.

(a) What is the total of her bill?

(b) Count out her change from two $20.00 bills.

ASK YOUR INSTRUCTOR FOR

EXAM 1 ON SECTION C OF

MODULE 1.

SECTION D

MULTIPLICATION OF WHOLE NUMBERS

Explanation: Multiplication is really abbreviated addition. It is the process by which one number is added to itself as many times as there are units in another number.

Example: 4 x 6 means "4 added to itself 6 times"

i.e. 4 + 4 + 4 + 4 + 4 + 4 = 24

The number to be added a certain number of times is called the multiplicand, and the number of times it is to be added is called the multiplier. The result of all this addition is called the product.

Example: Multiply 853 - multiplicand
(by) x 28 - multiplier
6824
1706
23884 - product

To check the answer in multiplication, divide (SECTION E) the product by the multiplier. The resulting number should be the multiplicand.

Exercise 1

Multiply each of the following:

1. 325 x 8
2. 875 x 7
3. 562 x 29
4. 562 493 x 58
5. 7914 x 66
6. 968 134 x 578
7. 9246 x 354
8. 4999 x 209
9. 5 079 154 x 6 002

Exercise 2 - Problems

1. Miss Jones bought the following merchandise to replenish her stock: 1 doz. jars of hair conditioner at $3.85 each, 1 doz. lipstick at $1.82 each, 1½ doz. hair brushes at $2.15 each. What is the total of her bill?

2. A hair stylist must "double" his/her salary before the employer can realize any profit from his/her work.
   Miss Jones paid Mr. Mead $160.00 per week to start. The first week Mr. Mead's services amounted to $286.00. How much did Miss Jones lose on the first week's work?

3. Miss Taylor's salary is $160.00 per week. In the first week her intake for services amounted to $174.00, in the second week it was $190.00, in the third week it was $205.00, in the fourth week it was $245.00, and in the fifth week it was $205.00. How much did the employer lose on salary paid to Miss Taylor in the first five weeks of work?

4. The cost of cold permanent wave solution per permanent is $3.50, the shampoo costs $.05, three towels at $.20 each to launder are used, 3 hours of a hair stylist's time at $5.00 per hour are needed, retention papers cost $.10, and overhead costs (such as heat, light, rent, and so on) amount to $5.50.
   (a) What is the actual cost of the permanent wave?
   (b) What is the profit if the permanent wave is priced at $30.00?

5. Mrs. Graves bought the following for her beauty salon:

8 jars of hand cream at $.96 per jar

6 jars of cleansing cream at $2.25 per jar,

9 bottles of tint at $3.15 per bottle,

15 combs at $1.89 per comb.

What is the total amount of her bill?

ASK YOUR INSTRUCTOR FOR

EXAM 1 ON SECTION D OF

MODULE 1.

SECTION E

DIVISION OF WHOLE NUMBERS

Explanation: The process of finding the number of times that one number is contained in another is called division. The number to be divided is called the dividend, and the number by which the dividend is divided is called the divisor. The result of the division is the quotient. When the divisor does not evenly divide the dividend, the number left over is called the remainder.

Example: Divide 50649 by 7.

```
                 7235   - quotient
divisor    7 )50649    - dividend
               49
                16
                14
                 24
                 21
                  39
                  35
                   4   - remainder
```

To check the answer in division, multiply the quotient by the divisor and add the remainder. The resulting number should be the dividend.

Exercise 1

Divide each of the following:

1. 6198 ÷ 6
2. 8792 ÷ 8
3. 3084 ÷ 12
4. 246 518 ÷ 16
5. 45696 ÷ 48
6. 15635 ÷ 53
7. 20001 ÷ 44
8. 629 534 ÷ 274
9. 2 093 465 ÷ 654
10. 4 623 910 ÷ 3104

Exercise 2 - Problems

1. Miss Jones bought 7 jars of cleansing cream at $42.00 per dozen,

9 lipsticks at $24.00 per dozen, 8 bottles of hand lotion at $30.00 per dozen, and 10 hair brushes at $43.20 per dozen.

(a) Make a sales slip for the above order.

(b) Find the total cost of the order.

2. Find the cost of 4 pounds of soap granules at $29.30 per 10 pounds, ½ doz. spray lacquer at $30.00 per dozen, 2 gallons of polish remover at $11.50 per gallon, and 3/4 doz. tubes of scalp cream at $29.00 per dozen.

3. Miss Silver ordered the following supplies:

9 bottles of sanitizing tablets at $36.00 per dozen

1 quart of cuticle remover at $36.00 per gallon

1 quart of cuticle oil at $34.00 per gallon

2 pounds of hand cream at $4.22 per pound.

(a) Find the total cost of the order.

(b) How much does the hand cream cost per ounce?

(c) How much does the cuticle remover cost per pint?

(d) How much does the cuticle oil cost per pint?

4. Miss Jones pays Miss Adams $160.00 per week. She works 40 hours per week.

(a) How much does she receive per hour?

(b) Miss Adams was idle 5 hours and 30 minutes during the week. How much did Miss Jones pay for idle time?

5. Miss Smith's beauty salon is 55 feet long and 46 feet wide. How much will it cost her to cover her floor with linoleum if she pays $18.95 per square yard?

ASK YOUR INSTRUCTOR FOR

EXAM 1 ON SECTION E OF

MODULE 1.

ASK YOUR INSTRUCTOR FOR

THE FINAL (SUMMATIVE) EXAM ON

MODULE 1.

APPENDIX B

Module 2--Fractions

MODULE 2

MATHEMATICS FOR

BEAUTY CULTURE APPRENTICES

FRACTIONS

Objectives

Upon successful completion of this module you will be able to:

1. Add, subtract, multiply and divide fractions.
2. Apply fractions to activities in daily life.
3. Apply fractions to activities in beauty salons.

Materials

1. Notebook, pen or pencil.

References

1. Mathematics of Business
2. Business and Consumer Mathematics
3. Refresher Mathematics

Instructions

1. Carefully read and study the material contained in each section.
2. Solve (correctly) all problems given in each section before moving on to the next section.
3. When you encounter difficulty in solving a problem, please consult with your instructor.
4. At the appropriate places (as noted in the module) ask your instructor for the required (formative) exam. You are to correct this exam yourself and record the result and the date on the Student Evaluation Record "A". If you fail to score 70% on the exam, then you are to consult with your instructor who will provide you with additional help before you write a second (and final) exam on the material.
5. After you have completed the entire module, ask your instructor for the final (summative) examination on the whole module. If you do not achieve 75% on this examination, then you are to again consult with your instructor who will provide you with additional help. As with the formative exams, you are given only two opportunities to score 75%. If you fail to do so in both attempts, then you will move on to the next module anyway.

SECTION A

REDUCING (AND RAISING) FRACTIONS

Explanation: A fraction is a quantity expressed in terms of two numbers, one above and one below a horizontal line; for example $\frac{4}{5}$ or $\frac{9}{2}$. Sometimes a slanting line is used; for example, 5/4 or 2/9. These two numbers are called the terms of the fraction. The upper number is called the numerator, and the lower number is called the denominator.

A proper fraction is one whose numerator is less than its denominator; for example, 2/5 or 1/3. An improper fraction is one whose numerator is equal to or greater than its denominator; for example, 8/8 or 9/5. A mixed number is the indicated sum of a whole number and a proper fraction; for example, 3 1/4 or 6 7/8.

The value of a fraction is not changed by multiplying or dividing both the numerator and the denominator by the same number. A fraction may, therefore, be reduced to lower terms or raised to higher terms.

To raise fractions to higher terms, multiply both the numerator and the denominator by the same number. Example: Raise 3/4 to higher terms. $3/4 = 3/4 \times 3/3 = 9/12$

To reduce fractions to lower terms, divide both the numerator and the denominator by the same number. Example: Reduce 32/60 to lower terms. $32/60 \div 2/2 = 16/30 \div 2/2 = 8/15$

A common method for reducing fractions is by the process of eliminating common factors; this process is usually called cancelling.

Example: $\frac{90}{105} = \frac{2 \times \cancel{5} \times 3 \times \cancel{5}}{\cancel{5} \times \cancel{5} \times 7} = \frac{2 \times 3}{7} = \frac{6}{7}$.

To reduce a fraction to lowest terms means to cancel all the factors that are common to the numerator and the denominator.

Example: $\frac{90}{105} = \frac{30}{35}$ - reduced to lower terms

$= \frac{6}{7}$ - reduced to lowest terms

Exercise 1

Raise the following fractions to higher terms:

Example: $\frac{1}{4} = \frac{?}{16} \Rightarrow \frac{1}{4} \times \frac{4}{4} = \frac{4}{16}$

(1) $\frac{5}{6} = \frac{?}{30}$ (2) $\frac{2}{3} = \frac{?}{48}$ (3) $\frac{7}{9} = \frac{?}{45}$

(4) $\frac{5}{8} = \frac{?}{24}$ (5) $\frac{14}{27} = \frac{?}{81}$ (6) $\frac{5}{11} = \frac{?}{121}$

(7) $\frac{18}{24} = \frac{?}{96}$ (8) $\frac{10}{15} = \frac{?}{90}$ (9) $\frac{22}{33} = \frac{?}{198}$

(10) $\frac{6}{10} = \frac{?}{1000}$ (11) $\frac{5}{14} = \frac{?}{84}$ (12) $\frac{7}{8} = \frac{?}{640}$

Exercise 2

Reduce the following fractions to lowest terms:

Example: 14/18 = 14/18 ÷ 2/2 = 7/9

(1) 15/18 (2) 25/30 (3) 21/24

(4) 125/175 (5) 44/88 (6) 13/169

(7) 78/182 (8) 69/96 (9) 180/200

(10) 42/168 (11) 90/279 (12) 14/98

ASK YOUR INSTRUCTOR FOR

EXAM 1 ON SECTION A OF

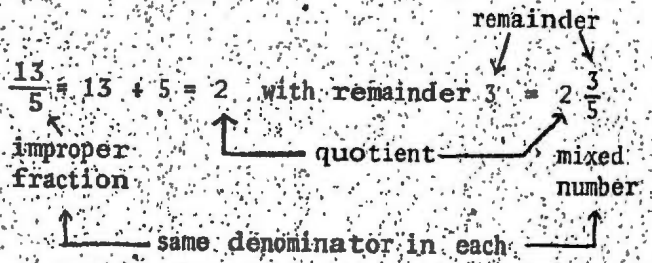
MODULE 2

SECTION B

CHANGING IMPROPER FRACTIONS TO MIXED NUMBERS

Explanation: To write an improper fraction as a mixed number, divide the numerator by the denominator and form a new fraction as shown in the following example.

Example:



Exercise

Write the following improper fractions as mixed numbers:

Example: 11/3 = 3 2/3

(1) 26/4	(2) 75/5	(3) 78/18
(4) 136/16	(5) 57/48	(6) 86/11
(7) 843/9	(8) 80/11	(9) 210/36
(10) 923/10	(11) 56/3	(12) 144/12

SECTION C

CHANGING MIXED NUMBERS TO IMPROPER FRACTIONS

Explanation: To change a mixed number to an improper fraction, multiply the whole number by the denominator of the fraction, add the numerator of the fraction and write this number over the denominator.

Example:

$$2\frac{3}{5} = \frac{(5 \times 2) + 3}{5} = \frac{10 + 3}{5} = \frac{13}{5}$$

Exercise

Write the following mixed numbers as improper fractions:

Example: $7\ 1/6 = \frac{(6 \times 7) + 1}{6} = \frac{42 + 1}{6} = \frac{43}{6}$

(1) 9 4/7	(2) 6 2/11	(3) 35 7/8
(4) 33 2/3	(5) 26 5/8	(6) 195 2/5
(7) 16 1/6	(8) 12 3/10	(9) 43 2/9
(10) 215 3/7	(11) 68 1/4	(12) 86 7/20

ASK YOUR INSTRUCTOR FOR

EXAM 1 ON SECTIONS B AND C OF

MODULE 2

SECTION D

COMMON DENOMINATORS

Explanation: When two or more fractions have the same denominator, they are called like fractions and are said to have a common denominator.

Example: 2/7, 3/7, 5/7.

The least common denominator (LCD) of two or more fractions is the smallest number that contains each denominator without a remainder. A common method for determining the LCD is as follows:

Step 1: Write each denominator as a product of its smallest (prime) factors.

Step 2: Write each factor the greatest number of times that it is found in either denominator.

Step 3. Multiply these factors to find the LCD.

Example: Find the LCD of 1/24, 13/90, 2/75.

Solution: Step 1: $24 = 2 \times 2 \times 2 \times 3$

$90 = 2 \times 3 \times 3 \times 5$

$75 = 3 \times 5 \times 5$

Step 2: $(2 \times 2 \times 2) \quad (3 \times 3) \quad (5 \times 5)$

Step 3: $8 \times 9 \times 25 = 1800 = \text{LCD}$

Exercise

Find the least common denominator of each of the following:

(1) 5/18, 7/12 (2) 1/15, 5/6 (3) 11/54, 17/180

(4) 5/12, 1/9, 3/8 (5) 3/16, 1/30, 5/32 (6) 1/6, 2/3, 4/51

(7) 3/4, 5/12, 7/144 (8) 5/8, 2/9, 15/36 (9) 5/6, 3/16, 9/32

(10) 3/5, 1/2, 11/24 (11) 4/9, 7/16, 1/3, 5/8

(12) 1/4, 3/8, 5/7, 7/10

ASK YOUR INSTRUCTOR FOR

EXAM 1 ON SECTION D OF

MODULE 2.

SECTION E

ADDITION OF FRACTIONS

Explanation: To add fractions: (1) express the fractions as like fractions; that is, fractions having a common denominator - usually the least common denominator; (2) add the numerators and place the sum over the common denominator; (3) reduce to lowest terms.

Example: $3/4 + 2/3 = 9/12 + 8/12 = 17/12 = 1\ 5/12$

Exercise

Find the sum for each of the following:

(1) $5/18 + 7/12$

(2) $7/12 + 3/16$

(3) $10/32 + 4/30$

(4) $2/15 + 5/9$

(5) $1/2 + 5/16 + 3/4$

(6) $13/16 + 1/18 + 11/12$

(7) $8/45 + 5/9 + 3/5$

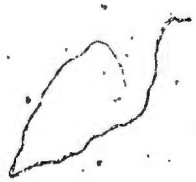
(8) $1/6 + 5/9 + 2/21$

(9) $1/9 + 10/27 + 2/3$

(10) $1/2 + 1/3 + 1/4 + 7/8$

(11) $2/3 + 8/15 + 1/5 + 11/30$

(12) $5/6 + 7/8 + 3/4 + 3/5$



SECTION F

ADDITION OF MIXED NUMBERS

Explanation: To add mixed numbers: (1) add the whole number parts of the mixed numbers; (2) find the LCD of the fractions; (3) write the fractions as like fractions, using the previously acquired LCD; (4) add the fractions - as done in SECTION E; (5) reduce to lowest terms.

Example: Add: 2 5/12 + 1 5/9 + 2 5/8

Solution: The LCD of 5/12, 5/9 and 5/8 is 72.

So, 5/12 = 30/72, 5/9 = 40/72 and 5/8 = 45/72.

Now, 2 5/12 + 1 5/9 + 2 5/8

= 2 + 1 + 2 + 5/12 + 5/9 + 5/8

= 2 + 1 + 2 + 30/72 + 40/72 + 45/72

= 5 + 115/72

= 6 + 43/72

= 6 43/72

Exercise

Add each of the following:

(1) 8 1/2 + 6 1/3

(2) 3 2/15 + 2 5/9

(3) 5 2/3 + 6 3/4

(4) 2 1/5 + 6 5/6 + 2 1/10

(5) 8 5/8 + 23 1/2 + 2 5/6

(6) 8 5/24 + 2 1/3 + 9

(7) 5 1/2 + 5/8 + 2 1/4 + 9 3/16

(8) 56 1/2 + 25 1/6 + 8 2/3 + 1/4

(9) 12 3/4 + 5 1/6 + 32 3/8 + 18 2/3

(10) 15 + 11/15 + 38 2/3 + 2 3/5

(11) 16 + 5 15/16 + 8 1/4 + 13 3/8

(12) 69 + 1/6 + 6 4/5 + 2 7/12 + 8 + 5 4/15

ASK YOUR INSTRUCTOR FOR

EXAM 1 ON SECTIONS E AND F OF

MODULE 2

SECTION G

SUBTRACTION OF FRACTIONS

Explanation: To subtract fractions: (1) find the LCD of the fractions; (2) write the fractions as like fractions, using the previously acquired LCD; (3) subtract the numerators and place the difference over the LCD; (4) reduce to lowest terms.

To subtract mixed numbers, change the mixed numbers to improper fractions and proceed as above.

Example 1: Subtract: 3/4 - 1/5.

Solution: The LCD of 3/4 and 1/5 is 20.

So, 3/4 = 15/20 and 1/5 = 4/20.

Now, 3/4 - 1/5 = 15/20 - 4/20 = 11/20.

Example 2: Subtract: 3 1/4 - 1 1/12.

Solution: Changing 3 1/4 and 1 1/12 to improper fractions, we get 13/4 and 13/12.

The LCD of 13/4 and 13/12 is 12.

So, 13/4 = 39/12 and 13/12 = 13/12.

Now, 3 1/4 - 1 1/2 = 13/4 - 13/12

= 39/12 - 13/12

= 26/12 = 13/6 = 2 1/6.

Exercise

Subtract each of the following:

(1) 3/8 - 5/16	(2) 5/12 - 1/4	(3) 5/6 - 3/4
(4) 2/3 - 7/33	(5) 34/45 - 2/3	(6) 19/20 - 3/4
(7) 6 3/4 - 2 1/6	(8) 5 3/10 - 3/4	(9) 10 - 3 5/16
(10) 4 7/18 - 2 11/12	(11) 25 2/3 - 16 11/12	(12) 2 6/32 - 1 1/6

ASK YOUR INSTRUCTOR FOR

EXAM 1 ON SECTION G OF

MODULE 2

SECTION H

MULTIPLICATION OF FRACTIONS

Explanation: The simplest arithmetic operation with fractions is multiplication. To multiply fractions: (1) change all mixed numbers to improper fractions; (2) write whole numbers as fractions having a denominator of one; (3) cancel out numerators into denominators or vice versa wherever possible; (4) multiply the remaining numerators; (5) multiply the remaining denominators; (6) reduce to lowest terms; (7) change improper fractions to mixed numbers.

Example: Multiply: 3/4 x 2 1/2 x 6

Solution: 3/4 x 2 1/2 x 6

$$= \frac{3}{4} \times \frac{5}{\cancel{2}_1} \times \frac{\cancel{6}^3}{1}$$

$$= \frac{45}{4}$$

$$= 11\ 1/4$$

Exercise

Multiply each of the following:

(1) 2/3 x 2/5

(2) 5/6 x 2/3

(3) 3 3/4 x 9/10

(4) 4 x 7/8

(5) 2 1/4 x 1 3/5

(6) 3 5/6 x 3/10

(7) 5/14 x 11/12 x 2/5

(8) 2 x 22 2/5 x 6 1/4

(9) 5 1/3 x 2 1/4 x 1 2/3

(10) 12 2/3 x 5 1/4 x 9/19

(11) 4 1/8 x 24 x 5 5/6

(12) 2/9 x 9/10 x 7/15 x 5/21

ASK YOUR INSTRUCTOR FOR

EXAM 1 ON SECTION H OF

MODULE 2

SECTION I

DIVISION OF FRACTIONS

Explanation: To divide by a fraction: (1) invert the divisor; (2) cancel out numerators into denominators or vice versa wherever possible; (3) multiply the two numerators; (4) multiply the two denominators; (5) reduce to lowest terms; (6) change improper fractions to mixed numbers.

Example 1: Divide: $5/7 \div 3/7$

Solution: $5/7 \div 3/7$

$$= \frac{5}{\cancel{7}_{1}} \times \frac{\cancel{7}^{1}}{3}$$

$$= \frac{5}{3}$$

$$= 1\ 2/3.$$

Example 2: Divide: $2\ 8/9 \div 7\ 1/3$

Solution: $2\ 8/9 \div 7\ 1/3$

$$= 26/9 \div 22/3$$

$$= \frac{\cancel{26}^{13}}{\cancel{9}_{3}} \times \frac{\cancel{3}^{1}}{\cancel{22}_{11}}$$

$$= \frac{13}{33}$$

Exercise 1

Divide each of the following:

(1) $3/5 \div 2/3$ (2) $4/9 \div 2/3$

(3) $6/7 \div 3/14$ (4) $5 \div 1/2$

(5) $7/40 \div 21/25$ (6) $3\ 3/4 \div 2\ 1/2$

(7) 4 1/5 ÷ 1 2/5

(8) 3/4 ÷ 2 5/8

(9) 15 5/6 ÷ 9 1/2

(10) 11 2/3 ÷ 2 2/9

(11) 2/3 ÷ 6

(12) 6 2/5 ÷ 5 1/3

Exercise 2 - Problems

(1) How many curtains can be made from 56 yards of material if it takes 3 1/2 yards for one curtain?

(2) How much will each of the above curtains cost at $9.50 per yard?

(3) If 4 2/3 yards of curtain material cost $42.00, how much will 6 2/3 yards cost?

(4) Wave clips cost $2.50 per dozen. How much will 5 1/2 dozen cost?

(5) If 1/4 yard of gauze used in giving a facial costs $.30, how much will 8 1/2 yards cost?

(6) Mr. Crown bought the following supplies for his shop:
3/4 dozen bottles of setting lotion at $15.00 per dozen;
1 1/2 dozen jars of cream at $27.00 per dozen;
1/3 dozen cans of spray lacquer at $30.00 per dozen.
Make out a bill and find the cost of the above order.

(7) A hair stylist was paid a regular weekly salary of $140.00. Her tips for one week amounted to 2/5 of her salary. How much money did she receive for the week?

(8) A hair stylist must double his/her salary before the employer can realize a profit on his/her services. Mr. Hardy is paid a salary of $140.00 per week. The first week he performed services

which amounted to 3/5 that amount.

(a) How much services income did he produce?

(b) How much did his employer lose on his week's work?

(9) Mrs. Butt bought the following items to replenish her stock of merchandise for resale:

1/2 dozen creams at $27.00 per dozen;

1/3 dozen tints at $37.80 per dozen;

3/4 dozen setting lotions at $15.00 per dozen;

1/4 dozen lipstick at $33.00 per dozen;

1 only hair brush at $42.00 per dozen.

(a) How many dozen items did she buy?

(b) What is the cost of the entire order?

ASK YOUR INSTRUCTOR FOR

EXAM 1 ON SECTION I OF

MODULE 2

ASK YOUR INSTRUCTOR FOR

THE FINAL (SUMMATIVE) EXAM ON

MODULE 2

APPENDIX C

Module 3--Decimals

MODULE 3

MATHEMATICS FOR

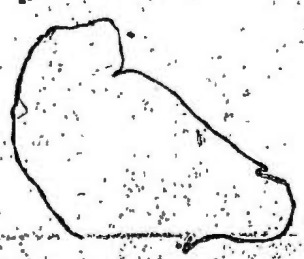
BEAUTY CULTURE APPRENTICES

DECIMALS

Objectives

Upon successful completion of this module you will be able to:

1. Convert decimal numbers to fractions and vice versa.
2. Add, subtract, multiply and divide decimals.
3. Apply decimals to activities in daily life.
4. Apply decimals to activities in beauty salons.



Materials

1. Notebook, pen or pencil.

References

1. Mathematics of Business
2. Business and Consumer Mathematics
3. Refresher Mathematics
4. Mathematics for Business Occupations

Instructions

1. Carefully read and study the material contained in each section.
2. Solve (correctly) all problems given in each section before moving on to the next section.
3. When you encounter difficulty in solving a problem, please consult with your instructor.
4. At the appropriate places (as noted in the module) ask your instructor for the required (formative) exam. You are to correct this exam yourself and record the result and the date on the Student Evaluation Record "A". If you fail to score 70% on the exam, then you are to consult with your instructor who will provide you with additional help before you write a second (and final) exam on the material.
5. After you have completed the entire module, ask your instructor for the final (summative) examination on the whole module. If you do not achieve 75% on this examination, then you are to again consult with your instructor who will provide you with additional help. As with the formative exams, you are given only two opportunities to score 75%. If you fail to do so in both attempts, then you will move on to the next module anyway.

SECTION A

INTRODUCTION

Explanation: A decimal number is a fraction whose denominator is a power of 10. (Remember that a "power of 10" is simply a multiple of 10; that is, 10; 100, 1000, 10000 and so on.) A decimal point is used to indicate the denominator.

Example:

decimal form			fraction form
.6	=	6 tenths	= 6/10
.05	=	5 hundredths	= 5/100
.32	=	32 hundredths	= 32/100
.004	=	4 thousandths	= 4/1000
.267	=	267 thousandths	= 267/1000

Exercise

Write each of the following decimals in the fraction form (that is, as a common fraction):

(1) .8 (2) .02 (3) .613

(4) .060 (5) .1293 (6) .4685

(7) .98623 (8) .5400 (9) 18.65

SECTION B

CHANGING COMMON FRACTIONS TO DECIMALS

Explanation: To change a common fraction to a decimal, write the numerator, place a decimal point after it, add zeros, and divide by the denominator.

Example 1: Change 5/8 to a decimal.

Solution:

```
      .625
   8 ) 5.000
       4 8
       ----
         20
         16
         --
          40
          40
          --
```

Thus 5/8 = .625

Example 2: Change 2/3 to a decimal.

Solution:

```
      .6666
   3 ) 2.0000
       1 8
       ----
         20
         18
         --
          20
          18
          --
           20
           18
           --
            2
```

Thus, when rounded off to three places, 2/3 = .667.

(Remember to round up if the next digit is 5 or greater.)

Example 3: Change 7/22 to a decimal.

Solution:

$$
\begin{array}{r}
.3181 \\
22\overline{)7.0000} \\
\underline{6\ 6} \\
40 \\
\underline{22} \\
180 \\
\underline{176} \\
40 \\
\underline{22} \\
18
\end{array}
$$

Thus, when rounded off to three places, 7/22 = .318 .

Exercise

Change the following common fractions to decimals (round off to three places after the decimal point):

(1) 1/2	(2) 3/8	(3) 1/6
(4) 9/11	(5) 1/16	(6) 21/32
(7) 3/4	(8) 5/6	(9) 2/9
(10) 18/19	(11) 4/5	(12) 1/3

SECTION C

CHANGING DECIMALS TO COMMON FRACTIONS

Explanation: To change a decimal to a common fraction, write the decimal as a common fraction (SECTION A) and reduce it to lowest terms.

Example 1: .75 = 75/100 = 3/4

Example 2: $.26\ 2/3 = \frac{26\ 2/3}{100} = 26\ 2/3 \div 100$

$$= \frac{80}{3} \times \frac{1}{100_5}$$

$$= 4/15$$

Exercise

Change the following decimals to common fractions:

(1) .5	(2) .08	(3) .85
(4) .25	(5) .16	(6) .005
(7) .038	(8) .225	(9) .12 1/2
(10) .2 2/3	(11) .25 1/4	(12) .83 1/3

ASK YOUR INSTRUCTOR FOR

EXAM 1 ON SECTIONS A, B AND C OF

MODULE 3.

SECTION D

ADDITION OF DECIMALS

Explanation: To add decimals, write the numbers in such a way that the decimal points are directly under each other. (Remember that a whole number can be considered as having a decimal point immediately following the number. Also remember that zeros can be arbitrarily added to the right of a decimal point.)

Example 1: Add: 2.68 + 5.13

Solution:
$$\begin{array}{r} 2.68 \\ 5.13 \\ \hline 7.81 \end{array}$$

Example 2: Add: 4.5 + 12 + 13.63

Solution:
$$\begin{array}{r} 4.50 \\ 12.00 \\ 13.63 \\ \hline 30.13 \end{array}$$

Exercise

Add each of the following:

(1) 25.61 + 9.59

(2) 18.5 + 128.75

(3) 6 + 5.3 + 19.82

(4) 56.25 + .86 + 12

(5) 258.08 + 2.56 + 9.5

(6) 20.005 + 19.3 + 35.29

(7) 2.986 + 85 + 2.1

(8) 12.05 + .003 + 16 + .25

(9) 16.35 + .681 + 9.2

(10) 72 + 83.1 + .625 + 5.99

SECTION E

SUBTRACTION OF DECIMALS

Explanation: To subtract decimals, write the two numbers in such a way that the decimal points are directly under each other. (Remember that a whole number can be considered as having a decimal point immediately following the number. Also remember that zeros can be arbitrarily added to the right of a decimal point.)

Example 1: Subtract: 18.23 - 12.56

Solution:
$$\begin{array}{r} 18.23 \\ -12.56 \\ \hline 5.67 \end{array}$$

Example 2: Subtract: 23.582 - 16.69

Solution:
$$\begin{array}{r} 23.582 \\ -16.690 \\ \hline 6.892 \end{array}$$

Example 3: Subtract: 458.6 - 25.895

Solution:
$$\begin{array}{r} 458.600 \\ -\ 25.895 \\ \hline 432.705 \end{array}$$

Exercise

Subtract each of the following:

(1) 36.26 - 8.19 (2) 6.052 - .571

(3) 1.19 - .85 (4) 269.5 - 89.93

(5) 563.56 - 75.8 (6) 89.64 - 9.650

(7) 3.1 - 2.885 (8) 65 - 59.0008

(9) 481.25 - 98.9898 (10) 90.1 - 12.001

ASK YOUR INSTRUCTOR FOR

EXAM 1 ON SECTIONS D AND E OF

MODULE 3.

SECTION F

MULTIPLICATION OF DECIMALS

Explanation: To multiply decimals: (1) multiply the two decimals as if they were whole numbers; (2) the number of decimal places (digits to the right of the decimal point) in the product is the sum of the number of decimal places in the multiplicand and the multiplier; (3) zeros must be written to the left of the product to make up the required number of decimal places if not enough such places are present.

Example 1: 2.64 x 3.2

```
= 2.64    (2 decimal places)
  x 3.2   (1 decimal place)
    528
   792
  8.448   (3 decimal places)
```

Example 2: .024 x .06

```
= .024    (3 places)
  x .06   (2 places)
 .00144   (5 places)
```

Exercise

Multiply each of the following:

(1) 4.56 x 2.1 (2) 5.08 x 3.4

(3) 28.6 x 2.9 (4) 358.5 x .68

(5) 58.24 x 8.3 (6) 6.4 x .395

(7) 65.15 x .027 (8) 5.078 x .062

(9) 1.54 x .2654 (10) 3.8 x 1.5 x 9.21

SECTION G

DIVISION OF DECIMALS

Explanation: To divide decimals: (1) write the divisor and dividend in standard long division form; (2) shift the decimal point in the divisor to the right so as to make the divisor a whole number; (3) shift the decimal point in the dividend the same amount (add zeros if necessary); (4) place the decimal point in the answer space directly above the new decimal point position in the dividend; (5) complete the division exactly as you would with whole numbers.

Example 1: $6.8 \div 1.7$

Solution: Step 1: $1.7\overline{)6.8}$

Step 2: $1.7\overline{)\ \ }$

Step 3: $1.7.\overline{)6.8.}$

Step 4: $17.\overline{)68.}$

Step 5:
$$\begin{array}{r} 4. \\ 17.\overline{)68.} \\ \underline{68} \end{array}$$

So, $6.8 \div 1.7 = 4$

Example 2: $.74 \div .3$

Solution: $.3\overline{).74} = 3.\overline{)7.4000}$

$$\begin{array}{r} 2.4666 \\ 3.\overline{)7.4000} \\ \underline{6} \\ 14 \\ \underline{12} \\ 20 \\ \underline{18} \\ 20 \\ \underline{18} \\ 20 \\ \underline{18} \\ 2 \end{array}$$

So, .74 ÷ .3 = 2.467 (rounded off to three decimal places).

Exercise 1

Divide each of the following (round off to three decimal places):

(1) 1.052 ÷ 3 (2) 7 ÷ .25

(3) 3.5 ÷ .001 (4) 12.3 ÷ 4.7

(5) 4.27 ÷ .009 (6) 21.23 ÷ 98.7

(7) 6.001 ÷ 2.001 (8) 3.51 ÷ .92

(9) 19.26 ÷ .031 (10) 123.21 ÷ .1111

Exercise 2 - Problems

(1) A salesman for beauty supplies sold a quantity of shampoo granules and received $264.00 for selling them.

(a) If his commission was $.44 per pound, how many pounds did he sell?

(b) The price per pound was $2.40. What was the total value of the granules?

(2) Miss Ward worked in a beauty salon from 9:00 a.m. to 5:00 p.m. with one hour off for lunch. At $3.60 per hour, how much did she earn in five days?

(3) (a) If combs cost $1.80 each, how many dozen combs can be bought for $57.60?

(b) The selling price is $2.25 per comb. All but two combs were sold. How much profit was made on the combs sold?

(4) Miss Stevens wanted her beauty salon painted. She consulted a painter who gave her an estimate of $475.00 with materials furnished. Miss Stevens decided to buy the materials herself and hire the painter at $8.75 per hour. The paint cost $62.30, the varnish cost $48.10, and other materials cost $29.80. The painter worked 6 hours on Tuesday, 7 hours on Wednesday and 5 hours on Thursday.

(a) Find the total cost.

(b) Did Miss Stevens make a wise decision?

(5) Two hair stylists each waste 1/2 ounce of shampoo on each customer shampooed.

(a) How much do they waste doing eight customers each in a day?

(b) Counting 250 working days per year and an average of eight shampoos per day, how many gallons of shampoo do these hair stylists waste in a year?

(c) If the shampoo costs $18.75 per gallon, how much money does the employer lose per year on the two hair stylists' wastefulness?

(6) Miss Duncan's regular work week is 40 hours, and she receives a salary of $160.00. She receives $5.75 per hour for each hour overtime she works. She worked 3 1/2 hours overtime on Thursday, 3 hours on Friday and 2 1/2 hours on Saturday.

(a) How much overtime pay did she receive?

(b) She received $26.80 in tips besides her salary. How much did she receive in all for the week?

ASK YOUR INSTRUCTOR FOR

EXAM 1 ON SECTIONS F AND G OF

MODULE 3.

ASK YOUR INSTRUCTOR FOR

THE FINAL (SUMMATIVE) EXAM ON

MODULE 3.

APPENDIX D

Module 4--Percent

MODULE 4

MATHEMATICS FOR

BEAUTY CULTURE APPRENTICES

PERCENT

Objectives

Upon successful completion of this module you will be able to:

1. Understand the concept of percent.
2. Convert decimal numbers to percents.
3. Convert percents to decimal numbers.
4. Convert common fractions to percents.
5. Convert percents to common fractions.
6. Find a percent of a number.
7. Find what percent one number is of another.
8. Find a number when a percent of the number is known.

Materials

1. Notebook, pen or pencil

References

1. Mathematics of Business
2. Business and Consumer Mathematics
3. Refresher Mathematics

Instructions

1. Carefully read and study the material contained in each section.
2. Solve (correctly) all problems given in each section before moving on to the next section.
3. When you encounter difficulty in solving a problem, please consult with your instructor.
4. At the appropriate places (as noted in the module) ask your instructor for the required (formative) exam. You are to correct this exam yourself and record the result and the date on the Student Evaluation Record "A". If you fail to score 70% on the exam, then you are to consult with your instructor who will provide you with additional help before you write a second (and final) exam on the material.
5. After you have completed the entire module, ask your instructor for the final (summative) examination on the whole module. If you do not achieve 75% on this examination, then you are to again consult with your instructor who will provide you with additional help. As with the formative exams, you are given only two opportunities to score 75%. If you fail to do so in both attempts, then you will move on to the next module anyway.

SECTION A

CHANGING DECIMAL NUMBERS TO PERCENTS

Explanation: The word percent comes from the Latin words per centum meaning "by the hundred" or "for every hundred." A number expressed as a percent is being compared with a second number called the standard or base by dividing the base into 100 equal parts and writing the comparison number as so many hundredths of the base. For example, 40 percent - written 40% - means 40 parts in 100 or 40/100 or 0.40.

To change a decimal number to a percent, the procedure is simply to multiply the decimal number by 100%.

Example 1: $0.60 = 0.60 \times 100\% = 60\%$

Example 2: $0.375 = 0.375 \times 100\% = 37.5\%$

Example 3: $4.5 = 4.5 \times 100\% = 450\%$

Exercise

Change the following decimal numbers to percents:

(1) 0.25	(2) 0.185	(3) 0.04	(4) 0.015
(5) 2.3	(6) 5.06	(7) 18.1	(8) 2.009
(9) 6.0825	(10) 3	(11) 0.006	(12) 285

SECTION B

CHANGING PERCENTS TO DECIMAL NUMBERS

Explanation: To change a percent to a decimal number, the procedure is to divide by 100% and then divide the denominator into the numerator.

Example 1: $50\% = \frac{50\%}{100\%} = \frac{50}{100} = 0.5$

Example 2: $8\% = \frac{8\%}{100\%} = \frac{8}{100} = 0.08$

Example 3: $0.2\% = \frac{0.2\%}{100\%} = \frac{0.2}{100} = 0.002$

Exercise

Change the following percents to decimal numbers:

(1) 4%	(2) 0.5%	(3) 20%	(4) 5%
(5) 75%	(6) 0.01%	(7) 2.5%	(8) 0.375%
(9) 0.008%	(10) 18.5%	(11) 350%	(12) 100%

ASK YOUR INSTRUCTOR FOR

EXAM 1 ON SECTIONS A AND B OF

MODULE 4.

SECTION C

CHANGING COMMON FRACTIONS TO PERCENTS

Explanation: The easiest way to change a fraction to a percent is to convert the fraction to decimal form by dividing the denominator into the numerator and then multiply by 100%.

Example 1: 1/2 = 0.50 = 0.50 x 100% = 50%

Example 2: 1 7/20 = 27/20 = 1.35 = 1.35 x 100% = 135%

Example 3: 5/16 = 0.3125 = 0.3125 x 100% = 31.25% = 31 1/4%

Some fractions cannot be converted to exact decimals. For example, 1/3 = 0.333... where the threes continue to repeat endlessly. We can round off to get an approximate percent. So, 1/3 = 0.333 x 100% = 33.3%.

Exercise

Change the following to percents:

(1) 3/4	(2) 6/25	(3) 7/8	(4) 4/5
(5) 3/16	(6) 1/6	(7) 2/3	(8) 2 2/5
(9) 4/7	(10) 2 2/3	(11) 3/40	(12) 3 3/10

SECTION D

CHANGING PERCENTS TO COMMON FRACTIONS

Explanation: To change a percent to a fraction, divide by 100% and reduce to lowest terms.

Example 1: $36\% = \frac{36\%}{100\%} = \frac{36}{100} = \frac{9}{25}$

Example 2: $12\frac{1}{2}\% = \frac{12\frac{1}{2}\%}{100\%} = \frac{12\frac{1}{2}}{100} = \frac{25/2}{100} = \frac{25}{200} = \frac{1}{8}$

Note that $\frac{25/2}{100} = \frac{25}{2} \div 100 = \frac{25}{2} \times \frac{1}{100} = \frac{25}{200}$

Example 3: $125\% = \frac{125\%}{100\%} = \frac{125}{100} = \frac{5}{4} = 1\frac{1}{4}$

Exercise

Change the following percents to common fractions and reduce to lowest terms:

(1) 18%	(2) 6%	(3) 25%	(4) 7%
(5) $3\frac{1}{2}\%$	(6) $\frac{1}{2}\%$	(7) 175%	(8) $16\frac{1}{2}\%$
(9) 240%	(10) 7 1/3%	(11) $125\frac{1}{2}\%$	(12) 3 1/8%

ASK YOUR INSTRUCTOR FOR

EXAM 1 ON SECTIONS C AND D OF

MODULE 4.

SECTION E

PERCENT PROBLEMS

Explanation: In all of your work with percent you will find that there are three basic types of problems. These form the basis for all percent problems that arise in business, industry, science or any other area. All of these problems involve three quantities: (1) the base or total amount or standard used for a comparison; (2) the percentage or part being compared with the base or total; (3) the percent or rate which indicates the relationship of the percentage to the base. All three types of problems involve finding one of these three quantities when the other two are known. In every problem follow these seven steps:

Step 1: Translate the problem sentence into a math sentence. For example, the question "50% of what number is 16?" should be translated as follows:

50% of what number is 16?

50% x n = 16

So we have the math sentence 50% x n = 16.

In this case, 50% is the percent or rate; n, the unknown quantity, is the total or base; and 16 is the percentage or part of the total. Notice that the words and phrases in the problem are translated into math symbols. The word "of" is translated as "multiply." The word "is" is translated as "equals." The phrase "what number" is translated as the unknown quantity "n." Note that this unknown quantity may be represented by any letter of the alphabet.

Step 2: It will be helpful if you label which numbers are the base or total (T), the percent (%), and the percentage or part (P).

So we have:

$$\underset{\%}{50\%} \times \underset{T}{n} = \underset{P}{16}$$

Step 3: Rearrange the equation so that the unknown quantity is alone on the left of the equal sign and the other quantities are on the right of the equal sign. The equation $50\% \times n = 16$ becomes $n = 16 \div 50\% = \frac{16}{50\%} = \frac{16}{.50}$

Step 4: Make a reasonable estimate of the answer. Guess, but guess carefully. Good guessing is an art.

Step 5: Solve the problem by doing the arithmetic. Remember to rewrite all percents as fractions or decimals before multiplying or dividing.

Step 6: Check your answer against the original guess. If the two numbers are not the same, or at least close, you have probably made a mistake and should repeat your work.

Step 7: Double check by putting the answer (number) you have found into the original problem or equation to see if it makes sense. If possible, use the answer to calculate one of the other numbers in the equation as a check.

SECTION F

FINDING THE PERCENTAGE - TYPE 1 PROBLEMS

Explanation: Type 1 problems are usually stated in the form "Find 30% of 50" or "What is 30% of 50?" or 30% of 50 is what number?"

Step 1: Translate. 30% x 50 = n

Step 2: Label. % x T = P

Step 3: Rearrange. n = 30% x 50

Step 4: Guess. 30% of 50 is roughly 1/3 of 50 or about 17.

Step 5: Solve. n = 30% x 50 = 0.30 x 50 = 15.

Step 6: Check. The answer (15) and the guess (17) are not exactly the same, but they are reasonably close. The answer seems acceptable.

Exercise 1

Solve each of the following:

(1) 25% of 160

(2) 2% of 140

(3) 35% of $20.00

(4) 8½% of $480.00

(5) 5 1/3% of 3.3

(6) 120% of $15.00

(7) 1/2% of $500.00

(8) 43% of $3900.00

(9) 3 3/4% of $2725.00

(10) 7¼% of $1000.00

(11) 6½% of $52.50

(12) 44% of $444.00

Exercise 2 - Problems

(1) A beauty salon did $64 500.00 worth of business last year. This year the business increased 12½%. How much was realized from this year's business?

(2) The owner of a beauty salon averaged a 25% loss on two hair stylists' salaries for a period of six weeks. Each hair stylist was paid $160.00 per week. What was the total loss for the six weeks?

(3) The income of a beauty salon was $56 238.00 for one year. Of this total, 45% was paid out in salaries. How much was paid out in salaries?

(4) A beauty salon with an income of $68 542.00 for one year had the following expenses: salaries - 45%, rent - 15%, supplies and miscellaneous expenses - 20%.
(a) What were the expenses for the year?
(b) How much did the owner have left for herself?

(5) For the previous year, Mr. Park's laundry bill was $915.00; he paid $4 126.00 for supplies, and he paid out $15 325.00 in salaries. The employees wasted 2% of the laundry by unnecessarily using towels and 10% of the supplies by carelessness. Also, 8% of the salaries was paid for idle, unproductive time. How much did Mr. Park lose on these three items?

ASK YOUR INSTRUCTOR FOR

EXAM 1 ON SECTION F OF

MODULE 4.

SECTION G

FINDING THE RATE OF PERCENT - TYPE 2 PROBLEMS

Explanation: Type 2 problems are usually stated "7 is what percent of 16?" or "Find what percent 7 is of 16" or "What percent of 16 is 7?"

Step 1: Translate. What percent of 16 is 7?

n% x 16 = 7

Step 2: Label. % x T = P

Step 3: Rearrange. n% = 7/16

Step 4: Guess. 7/16 is very close to 8/16 or 1/2 or 50%.

The answer will be a little less than 50%.

Step 5: Solve. $n\% = \frac{7}{16} = \frac{7}{16} \times 100\% = \frac{700}{16}\%$

So, n% = 43 3/4% or 43.75%.

Step 6: Check. The answer (43 3/4%) is reasonably close to our preliminary guess (less than 50%). The answer seems acceptable.

Exercise 1

(1) What percent of 40 is 16?

(2) What percent of 2 is 3.5?

(3) What percent of $1200. is $150.?

(4) Find what percent 65 is of 25.

(5) $6.50 is what percent of $18.00?

(6) 10 2/5 is what percent of 2.6?

(7) What percent is $50.00 of $7 500.00?

(8) What percent of $2 200.00 is $5.50?

(9) What percent of $75.00 is $46.50?

(10) What percent of $1 875.00 is $600.00?

Exercise 2 - Problems

(1) A beauty salon did $88 450.00 worth of business in one year. The payroll amounted to $42 456.00. What percent of the total income was the payroll?

(2) A beauty salon owner bought equipment amounting to $2 640.00. He paid $1 003.20 as a down payment. What percent of the bill did he pay?

(3) Miss Fisher spent $3 180.00 to advertise her business last year. The receipts for the year were $63 620.00. What percent of the receipts was spent on advertising?

(4) A supply salesman sold equipment to a beauty salon owner amounting to $10 672.35. He received $1 641.90 for his share of the sale. What percent of the total sale did he receive?

ASK YOUR INSTRUCTOR FOR

EXAM 1 ON SECTION G OF

MODULE 4.

SECTION H

FINDING THE BASE OR TOTAL AMOUNT - TYPE 3 PROBLEMS

Explanation: Type 3 problems are usually stated "8.7 is 30% of what number?" or "Find a number such that 30% of it is 8.7" or "8.7 is 30% of a number; find the number" or "30% of what number is equal to 8.7?"

Step 1: Translate. 30% of what number is equal to 8.7?

$30\% \times n = 8.7$

Step 2: Label. $\% \times T = P$

Step 3: Rearrange. $n = \frac{8.7}{30\%}$

Step 4: Guess. 9/.3 is 30. So, a reasonable guess is 30.

Step 5: Solve. $n = \frac{8.7}{30\%} = \frac{8.7}{.30} = 29.$

Step 6: Check. The answer (29) is very close to our original guess (30). Thus the answer seems acceptable.

Exercise 1

Solve each of the following:

(1) 16% of what number is equal to 5.76?

(2) 41 is 5% of what number?

(3) 2 is 8% of a number. Find the number.

(4) 12% of what number is equal to $75.?

(5) $840.00 is 5.2% of what number?

(6) 720 is 15% of a number. Find the number.

(7) 24% of what number is equal to $1,200.00?

(8) 125% of what number is 35?

(9) Find a number such that 12½% of it is 26¼.

(10) $640.00 is 18 3/4% of what number?

Exercise 2 - Problems

(1) Ms. Dunne's employer deducted 6% from her salary for insurance. It amounted to $14.40 for one week. What is Ms. Dunne's salary for the week?

(2) Mr. Lynch was allowed 2% off his bill for supplies for paying cash. He saved $20.25 on his order. What was the amount of the order?

(3) A beauty salon owner ordered supplies. She paid $750.00 which was 35% of the order. What was the amount of the order?

(4) Mrs. Owen's expenses for one year were $16 380.00 which amounted to 45% of her income. How much was her income for the year?

(5) Ms. Pardy opened a new beauty salon. She paid $3 150.00 cash on her equipment. This was 40% of the entire amount. How much did she pay for the equipment?

ASK YOUR INSTRUCTOR FOR

EXAM 1 ON SECTION H OF

MODULE 4.

SECTION I

COMMISSION

Explanation: The simplest practical use of percent is in the calculation of a part (or percentage) of some total. For example, sales persons are often paid on the basis of their success at selling and receive a commission or share of the sales receipts. One such group of people is hair stylists. Commission is usually described as a percent of sales income.

Example 1: Suppose your job pays 12% commission on all sales. How much do you earn on $400. in sales?

Solution: 12% of $400.

= 0.12 x $400.

= $48. = commission

Example 2: How much do you earn on sales of $1 299.95 if your commission rate is 6%?

Solution: 6% of $1 299.95

= 0.06 x $1 299.95

= $77.9970

= $78.00 rounded off

= commission

Exercise - Problems

(1) A beauty supply salesman had sales of $34 500.00 last month. His usual commission is 7%. How much did he earn last month?

(2) All hair stylists in Mr. Klein's beauty salon receive $160.00 per week plus a 25% commission on their sales in excess of $320.00 (double their salary). Miss Hiscock, an employee of Mr. Klein, had sales of $775.50 last week. What was her income for the week?

(3) Miss Baker also works in Mr. Klein's beauty salon. Her sales last week were $625.30. What was her income for the week?

(4) Mr. Butler works in a beauty salon where the salary is $145.00 per week and the commission rate is 30% (on sales in excess of double his salary). If his sales for two consecutive weeks were $775.50 and $625.30, how much would he earn each week?

(5) A beauty supply salesman received $2 550.00 in one month on his sales. His commision is 30% on all sales. Find the total amount of his sales for the month.

ASK YOUR INSTRUCTOR FOR

EXAM 1 ON SECTION I OF

MODULE 4.

SECTION J

COMMERCIAL DISCOUNTS

Explanation: Another important kind of percent problem involves the idea of discount. In order to stimulate sales, a merchant may offer to sell some item at less than its normal price. A discount is the amount of money by which the normal price is reduced. It is a percentage or part of the normal price. Several new words are worth learning. Discount is the reduction in price. List price is the normal, regular, or original price before the discount is subtracted. Net price or sale price is the new or discount price. The net price is always less than the list price, of course. Discount rate is a percent number that enables you to calculate the discount as a part of the regular or list price.

There are three main types of commercial discounts: trade discounts, cash discounts, and quantity discounts. A trade discount is a discount or percentage deducted from the list price of particular trade merchandise. It is given to those in that trade for use or for resale. An example would be 30% off the list price of cosmetics for resale. A quantity discount is a discount allowed on a given list price for purchasing a certain number or quantity. An example would be a 20% discount on buying 1000 pads of sales slips if they are $5.50 for 100. A cash discount is a discount allowed a purchaser for paying a bill in full within a certain time. An example would be a 5% discount for cash.

Exercise - Problems

(1) Ms. Johnson bought the following supplies for use in her beauty salon: one gallon shampoo - $18.75; four dozen wave clips - $10.00; one dozen cold wave lotion - $25.20; three pounds hand cream - $12.75. She was given a 5% discount for payment within 10 days, What was the amount of the check Ms. Johnson sent in payment for the supplies received?

(2) A window display figure costs $125.50. A 25% discount is given if two figures are purchased at the same time, while a 30% discount is given if three figures are purchased at the same time.
(a) How much is saved by buying two at the same time?
(b) How much is saved by buying three at the same time?

(3) Ms. Walsh ordered the following supplies for her beauty salon: three gallons shampoo at $18.75 per gallon; nine dozen combs at $24.00 per dozen; four pounds cotton at $3.25 per pound; twelve dozen boxes hair pins at $2.95 per dozen boxes. She was given an 8% discount on the order.
(a) What was the amount of her discount?
(b) How much did she pay for the order?

(4) Mr. Payne bought four manicure tables with chairs for $185.00 each. The terms of the sale were for a 12% discount if the bill was paid at the end of thirty days. He paid cash in ten days in which case the discount was 1½ times greater. How much did he pay for the tables?

(5) Miss Kean bought twelve dozen bottles of permanent wave solution at $25.20 per dozen. She was given a 15% discount on the order. When the order was received, eight bottles were broken for which she did not pay. How much did she pay?

(6) Mrs. Avery's beauty salon was 30 feet wide and 45 feet long. She had the floor covered with linoleum at $18.75 per square yard. She was given a 12% discount for cash. How much did she pay to have the floor covered?

(7) A beauty supply dealer bought equipment from the manufacturer amounting to $1 216.50 which he would sell to the beauty salons. The manufacturer gave trade discounts of 30% and 10%. Find the net cost of the equipment.

ASK YOUR INSTRUCTOR FOR

EXAM 1 ON SECTION J OF

MODULE 4.

SECTION K

PROFIT, LOSS, INVENTORY, AND DEPRECIATION

Explanation: Any legitimate business is a service to the community. Every business must make a substantial profit in order to exist. Without profit, it could not pay the expenses and leave enough money for the owner's livelihood plus an interest on his investment.

Profit: Profit or gain is the amount received over and above cost or expenses. It is figured at a given rate and added to the cost, thus making the selling price more than the cost.

Gross Profit = Net Sales — Cost of Goods Sold

Example: An order of cosmetics costs $26.35

They are sold at a 33 1/3% profit.

Profit = $26.35 x 33 1/3% = $8.78

Selling Price = $26.35 + $8.78 = $35.13

Net profit is the amount left after all expenses are paid. Net profit equals the amount taken in minus the operating expenses. Operating expenses are all the costs of running the business such as salaries, rent, supplies used, telephone, electricity, heat and so on.

Loss: A loss occurs when the selling price is less than cost.

Example: An order of cosmetics costs $26.35

They are sold at a 33 1/3% loss.

Loss = $26.35 x 33 1/3% = $8.78

Selling Price = $26.35 - $8.78 = $17.57

Inventory: Inventory is an itemized list of merchandise, supplies or equipment on hand. When taking inventory, the merchandise, supplies or equipment on hand are counted and recorded. This is done usually

at the end of a business year, but sometimes more frequently. To obtain the cost of goods sold or used, the amount left on hand must be subtracted from the amount purchased.

Example: $2 000. was paid for supplies in one year. The inventory at the end of the year showed $400. worth on hand. Therefore, $1600. was spent for supplies used.

Depreciation: Depreciation is the decrease in the value of property or equipment through use, age or becoming out-moded (obsolete). The depreciation of the equipment must be included in the operating expenses of the business. The equipment in a beauty salon will depreciate at least 10% each year, and at the end of ten years it will be worthless or outmoded.

Exercise - Problems

(1) Ms. Parker paid $176.85 for an order of cosmetics. She sold them all and received a 40% profit.

(a) How much did she receive for the cosmetics?

(b) How much was her gain?

(2) Mrs. Simpson's income from services in her beauty salon for one month was $2 167.95. Her expenses were as follows: salaries - $1 755.00; rent - $375.00; electricity and phone - $77.19; laundry - $109.26; supplies - $203.40; miscellaneous expenses - $23.10.

(a) How much were her expenses?

(b) Did she gain or lose and how much?

(c) What was the percent gain or loss?

(3) Mr. Bell worked for 50 weeks in a year and received an average salary of $300.00 per week. The income from his services was $36,200.00.

(a) What is the difference between his salary and the income from services?

(b) Since it is estimated that every hair stylist must double his salary, did his employer gain or lose, and how much?

(c) What is the percent of gain or loss?

(4) A beauty salon owner bought five new hair drying units (with chairs) at $395.50 each with a 20% discount. These units depreciated at the rate of 12% each year.

(a) How much did the owner pay for the units?

(b) What was the value of the units at the end of 5 years?

(c) What is the percent of depreciation in the 5 years?

(5) Ms. Stevens bought 20 gallons of shampoo at $18.75 per gallon. Through carelessness when shampooing, 20% of the shampoo was wasted.

(a) How much of the shampoo was wasted?

(b) How much did this waste cost Ms. Stevens?

(6) A beauty salon charges $45.00 for one type of cold wave. The cost of giving the wave are: salary - $12.00; permanent wave solution - $4.50; other expenses - $8.10.

(a) What is the cost of each cold wave?

(b) What percent profit is realized on the wave?

(7) Miss Russell's expenses for one month were $2 083.05. Her income was $3 256.30. What percent profit did she make on the month's business?

(8) Miss Russell took inventory of the cosmetics for resale on hand at the end of the fiscal year. The inventory showed cosmetics worth $568.95 retail, left unsold. Her profit from sales was $1 855.50.

(a) Find the amount of cosmetics sold.

(b) What is the cost of the unsold cosmetics if they were marked (priced) for 33 1/3% profit?

ASK YOUR INSTRUCTOR FOR

EXAM 1 ON SECTION K OF

MODULE 4.

ASK YOUR INSTRUCTOR FOR

THE FINAL (SUMMATIVE) EXAM ON

MODULE 4.



APPENDIX E

Module 5--Personal Finances



MODULE 5

MATHEMATICS FOR

BEAUTY CULTURE APPRENTICES

PERSONAL FINANCES

Objectives

Upon successful completion of this module you will be able to:

1. Calculate the amount of interest paid on bank loans.
2. Calculate the amount and percent of interest paid when buying articles on an installment plan.
3. Understand the three main methods of paying hair stylists' salaries.
4. Calculate a hair stylist's salary using any of the three methods (referred to in number 3).

Materials

1. Notebook, pen or pencil.

References

1. Mathematics of Business
2. Business and Consumer Mathematics

Instructions

1. Carefully read and study the material contained in each section.
2. Solve (correctly) all problems given in each section before moving on to the next section.
3. When you encounter difficulty in solving a problem, please consult with your instructor.
4. At the appropriate places (as noted in the module) ask your instructor for the required (formative) exam. You are to correct this exam yourself and record the result and the date on the Student Evaluation Record "A". If you fail to score 70% on the exam, then you are to consult with your instructor who will provide you with additional help before you write a second (and final) exam on the material.
5. After you have completed the entire module, ask your instructor for the final (summative) examination on the whole module. If you do not achieve 75% on this examination, then you are to again consult with your instructor who will provide you with additional help. As with the formative exams, you are given only two opportunities to score 75%. If you fail to do so in both attempts, then you will move on to the next module anyway.

SECTION A

INTEREST

Explanation: Simple interest is a service charge for the use of money. It is figured on the amount of money borrowed at a given rate or percent for a stated length of time, So we have:

Interest = Principal x Rate x Time

Amount = Interest + Principal

The principal is the sum of money loaned or borrowed. The interest is the sum of money paid for the use of the principal. The rate of interest is the percent paid for the use of $1.00 for 1 year. Interest is usually figured on the basis of 360 days per year, or 30 days per month.

A promissory note is a paper on which the borrower fills out and signs a written promise to pay back the amount of money borrowed. It may or may not carry interest. If the lender expects interest, the note will specify "with interest" at a given rate. The borrower is called the maker of the note, while the lender is known as the payee. The amount of money borrowed is called the face of the note. The date by which all the money is to be paid back is known as the due date or date of maturity.

Example 1: Find the amount to be repaid on a $300. loan at 12% for 1 year.

Solution: Interest = Principal x Rate x Time

Interest = $300. x 12% x 1 yr. = $36.00

Amount = Principal + Interest

Amount = $300. + $36. = $336.

Example 2: Find the interest on \$100. at 18% for 1 year, 3 months and 10 days.

Solution: To find the interest for years, months and days, change all to days and use them as part of a year.

So, 1 year = 360 days

3 months = 90 days

10 days = 10 days

Time = 460 days

Now, Interest = Principal x Rate x Time

$$= \cancel{100}^{1} \times \frac{\cancel{18}^{1}}{\cancel{100}_{1}} \times \frac{23}{\cancel{460}\ \cancel{360}_{20}}$$

$$= \$23.00$$

Example 3: Find the interest on \$500. at 12½% for 1½ years.

Solution: Interest = Principal x Rate x Time

$$= \cancel{\$500}^{5} \times \frac{25}{\cancel{200}_{2}} \times \frac{3}{\cancel{540}\ \cancel{360}_{2}}$$

$$= \$93.75$$

Exercise 1

Find the interest of each of the following:

(1) \$420. at 6% for 60 days

(2) \$150. at 8% for 60 days

(3) \$600. at 14% for 1 year

(4) \$6 500. at 16% for 2 years

(5) \$250. at 20% for 90 days

(6) \$8 200. at 18% for 3½ years

(7) $6 600. at 4% for 96 days

(8) $2 500. at 14½% for 1½ years

(9) $750. at 11% for 3 years, 2 months and 15 days

(10) $9 250. at 15½% for 2½ years

Exercise 2 - Problems

(1) Mrs. Simms borrowed $1 250.00 from the bank to make a down payment on some new equipment. She repaid the loan 4 months later with interest at 18%. Find the total amount she paid the bank.

(2) Ms. Davis borrowed $2 500.00 from the bank to remodel her beauty salon. The loan was for 1 year at 14%. The interest was paid in advance and deducted from the amount of the loan.

(a) How much was the interest?

(b) How much cash did she actually receive?

(3) On March 1, Mrs. Greene borrowed $2 150. from the bank at 18% interest to enable her to carry on the business of her beauty salon. Business improved and she was able to repay the loan with interest on August 1 of the same year. How much did she pay?

(4) Ms. Martin made a personal loan of $1 500. to her partner on November 5, at 12% interest. The loan was repaid on January 10. What was the amount of interest paid on the loan?

ASK YOUR INSTRUCTOR FOR

EXAM 1 ON SECTION A OF

MODULE 5.

SECTION B

INSTALLMENT BUYING

Explanation: Installment buying means that an article is paid for in a specified number of payments. A down payment is made and the balance is paid in equal amounts called installments.

The buyer does not acquire legal ownership of the article until the final payment is made. The seller has special expenses such as investigation of the buyer's credit rating, bookkeeping, money paid for the article, and collection. He must, therefore, charge a higher price than for a cash sale. Since the rate of interest is usually very high on installment buying, a great deal of money can be saved by paying cash whenever possible.

Example: Two hair drying units cost $800.00 cash. They may be purchased by paying $80.00 down and the balance in 18 monthly payments of $49.60 each. Find the difference between the cash price and the installment price, and find the rate of interest for the installment buying.

Solution: 18 payments @ $49.60 = $892.80 + $80.00 down

= $972.80 = installment price

Cash price = $800.00. So the difference is $172.80.

Rate of interest = $\frac{\$172.80}{\$800.00}$ = 0.216 = 21.6%.

Exercise - Problems

(1) A beauty salon owner buys a rug for her reception room. The price is $660.00. This is to be paid for in 8 monthly payments after the initial down payment of 1/3 of the price is made. What is the amount of each monthly payment?

(2) A beauty salon owner wanted to buy a cash register priced at $1 500.00 cash, or $420.00 down and 12 monthly installments at $115.00 each. She did not have the money to pay cash for the article.

(a) How much could be saved by borrowing $1 500.00 from the bank at 18% interest for 12 months?

(b) What is the rate of interest on the installment buying?

(3) Mr. Sharpe installed a new furnace, priced at $1 750.00, in his beauty salon. He paid $150.00 cash when he signed the contract. When the furnace was installed, he paid 25% of the balance in cash. Interest on the balance, at 20% (per year) for 1½ years, was added to the unpaid balance. This amount was to be paid in 6 equal quarterly installments.

(a) What was the amount of each installment?

(b) What was the total cost of the furnace?

(4) Ms. Walker bought some badly needed equipment that was priced at $2 500.00. Since she was unable to pay cash, she bought it on the installment plan. She paid $600.00 down and made 12 monthly payments of $210.00 each.

(a) How much more than the cash price did she pay?

(b) What interest rate did she pay on the installment plan?

(5) Mrs. Mercer needed a new car for transportation to her beauty salon. She was allowed $1,200.00 trade-in on her old car towards the new one priced at $7 920.00. She paid $600.00 cash, besides the allowance for her old car, and made 24 equal monthly installments. Find the amount of each installment.

ASK YOUR INSTRUCTOR FOR

EXAM 1 ON SECTION B OF

MODULE 5.

SECTION C

SALARY AND COMMISSIONS

Explanation: Money paid to an employee for the services he/she has rendered his/her employer is called salary. Commission is a percentage paid on the price of an article or for services rendered.

Cosmetologists are usually paid by one of three common methods: straight salary, salary and commission, or commission only. Straight salary means that the cosmetologist is paid by salary only. The amount depends on the locality, amount of business and the individual's ability.

Salary and commission means that the cosmetologist is guaranteed a salary and is also paid a commission on the services rendered. The amount of salary and commission is subject to agreement between the employer and the employee. Usually the commission ranges from 25% to 40% and is paid on the amount of money taken in from services after the guaranteed salary has been doubled. It is estimated that a cosmetologist must double her salary before the employer realizes any profit on services. Expenses such as rent, heat, light, interest on investment, depreciation and insurance amount to approximately as much as the cosmetologist's salary.

Commission only means that the cosmetologist is paid a commission or percent on all the money taken in from his/her services. The commission rarely amounts to more than 50%.

Exercise - Problems

(1) Ms. Dean is paid a straight salary of $160.00 a week plus a 10% commission on all cosmetics sales. She sold $62.20 worth of cosmetics in one week. The income for her services amounted to $396.50.

(a) How much did she actually receive?

(b) How much profit did Ms. Dean's employer realize on her services above double her salary?

(2) Mrs. Wang is paid $170.00 per week plus 40% on all money she earns in excess of $340.00. Her services amounted to $382.75. Her cosmetics sales amounted to $54.00, on which she received a 15% commission.

(a) How much commission did she receive on both services and sales?

(b) What is the total amount of salary she received?

(3) Mr. Pine is paid on the commission basis only. He is paid 50% of all money taken in from his services. He also receives a 15% commission on all cosmetics sales. One week his services amounted to $396.75 and his cosmetics sales amounted to $106.80. How much salary did he actually receive?

(4) Ms. McCarthy's service slips for one week were as follows: Tuesday - $120.25; Wednesday - $174.00; Thursday - $115.50; Friday - $185.00; Saturday - $201.25. Her salary is $160.00 per week and 40% commission on all money taken in over double her

guaranteed salary. What was her salary for the week?

(5) A beauty supply salesman receives a commission of 8% on sales of equipment and 14½% on supplies. His sales for a three-month period amounted to $59 350.00 for equipment and $5 730.00 for supplies.

(a) What were the earnings for the three-month period?

(b) How much did he average per month?

(c) How much did he average per week?

ASK YOUR INSTRUCTOR FOR

EXAM 1 ON SECTION C OF

MODULE 5.

ASK YOUR INSTRUCTOR FOR

THE FINAL (SUMMATIVE) EXAM ON

MODULE 5.

APPENDIX F

Module 6--Basic Accounting and Banking Procedures

MODULE 6

MATHEMATICS FOR

BEAUTY CULTURE APPRENTICES

BASIC ACCOUNTING AND BANKING PROCEDURES

Objectives

Upon successful completion of this module you will be able to:

1. Write a cash account for a small business.
2. Understand how to open a bank account.
3. Understand how to complete a deposit slip.
4. Understand how to write a cheque and keep a record of it.
5. Understand what is meant by the endorsement of a cheque.
6. Reconcile the bank balance as shown on a statement.

Materials

Notebook, pen or pencil.

References

1. Mathematics of Business
2. Business and Consumer Mathematics

Instructions

1. Carefully read and study the material contained in each section.
2. Solve (correctly) all problems given in each section before moving on to the next section.
3. When you encounter difficulty in solving a problem, please consult with your instructor.
4. After you have completed the entire module, ask your instructor for the final (summative) examination on the whole module. If you do not achieve 75% on this examination, then you are to consult with your instructor who will provide you with additional help. You are given only two opportunities to score 75%. If you fail to do so in both attempts, then you will move on to the next module anyway.

SECTION A

CASH ACCOUNT

Explanation: In order to successfully conduct a business the owner must keep an accurate record of all income and expenditures. This type of record is needed to show the amount of profit or loss at the end of the year. It is also needed to calculate the government taxes that must be paid on the profit, as well as the submission of retail sales taxes.

If a business does not show a significant profit, it cannot continue to operate for any period of time. The profit is the owner's compensation for money invested in the business, and also for the work and responsibility of keeping the business operating.

The following terms all apply to the maintenance of financial records. Assets are objects that a person owns (that is, material possessions). Liabilities are debts that a person owes. Creditor is the one to whom a debt is owed. Total liabilities refers to the total amount owed to all creditors. Personal liabilities are debts of an individual for his personal affairs. Business liabilities are debts incurred in the operation of a business. Proprietorship means ownership, or the difference between assets and liabilities. Capital is another term sometimes given to proprietorship.

There are two sides to the record when recording a cash account — the debit (DR) side and the credit (CR) side. All cash on hand and cash received are recorded in the left-hand column, called the debit side, of the cash account. All cash paid out is recorded in the right-hand column, called the credit side, of the cash account. Balance of Cash on Hand is the difference between

the debit and credit sides of the account, providing the debit side is the larger amount. In Closing the Account the balance is entered on the lesser side to make the total of that side equal to the total of the larger side of the account. The account is closed by ruling, as illustrated in the following example, showing the two equal sides.

Example:

CASH ACCOUNT

Date	Explanation	DR	CR
1981		$	$
March 1	Balance	3584.72	
1	Rent		400.00
1	Salaries		180.35
6	Services	664.75	
6	Mdse. Sales	156.90	
12	Salaries		140.89
12	Acme Co. Supplies		200.00
12	Electricity		65.51
12	Telephone		55.22
12	Services	600.75	
12	Mdse. Sales	130.05	
		$5137.17	$1041.97
	Balance	4095.20	4095.20
			$5137.17

Exercise - Problems

Draw up a cash account form and write a cash account for each of the following. Be sure to close the account.

1. Balance as of April 1 - $300.00; April 1: received in services - $30.25, received from merchandise sales - $16.40; paid to Ace Supply Company - $65.90. April 2: received in services - $110.80. April 4: received in services - $183.25, received from merchandise sales - $18.60; paid out for telephone - $22.38. April 5: received in services - $155.10, received from merchandise sales -

$12.50; paid out for rent - $420.00.

2. The following amounts refer to Ms. Carman's business for the previous year.

Balance - $1521.68; Income from services - $10303.80, income from merchandise sales - $1662.00; cost of merchandise and supplies - $3567.44; paid out for rent - $1880.00, paid out for electricity - $351.24, paid out for telephone - $196.80, paid out for laundry - $184.24, paid out for taxes and license fees - $122.84, paid out for miscellaneous expenses - $165.18.

3. The following amounts refer to Mr. Martin's business for the previous week.

Cash on hand - $606.69; income from services - $2525.25, income from cosmetics sales - $240.15; paid out for postage - $7.50, paid out for cleaning floors - $30.00, paid out for laundry - $52.44, paid out for supplies - $534.00, paid out for salaries - $890.67.

4. Balance as of May 1 - $1235.68; May 6: income from services - $701.25, income from cosmetics sales - $32.40. May 7: paid out for plumbing - $44.75, paid out for supplies - $90.00. May 8: income from services - $582.60; paid out for supplies - $45.75, paid out for magazines - $18.00. May 11: income from services - $693.40, income from cosmetics sales - $29.15; paid out for laundry - $38.14, paid out for taxes - $118.40, paid out for salaries - $695.14.

SECTION B

BANK ACCOUNTS

Explanation: Practically every business and many individuals have bank chequing accounts. A chequing account is a great convenience in paying bills. A cheque, instead of cash, may be given in payment for a bill.

Paying by cheque is safer than keeping a large sum of money on hand to pay bills. A cheque may be sent by mail with relative safety, while sending cash by mail would inour a great risk.

Before a person can write a cheque, he must first deposit a sum of money in the bank in his chequing account. Care must be taken not to write cheques amounting to more than the cash deposited. A cancelled cheque, one that has been used to pay a bill, is really a receipt showing that the bill has been paid.

Opening a bank account: To open a bank account, a person must sign a signature card indicating address, occupation/type of business and so on. A depositor should always sign his cheques with the same style of signature used on the signature card. Otherwise, the bank might refuse to pay out the depositor's money on suspicion of forgery.

Example of signature card:

TYPE NAME(S) IN FULL SURNAME FIRST

NO.

ADDRESS (including postal code)

☐ CHEQUING SAVINGS
☐ PERSONAL CHEQUING
☐ CURRENT

EMPLOYER/OCCUPATION

RES PHONE

BUS. PHONE

The undersigned, having opened the account designated above, hereby expressly agree(s) with CANADIAN IMPERIAL BANK OF COMMERCE that (i) the Bank may periodically debit to said account its usual charges for keeping the account, the rate of charges may be ascertained on enquiry (ii) upon negotiation at any branch of the Bank of any cheque drawn on said account the Bank may, if and whenever it sees fit, immediately debit the amount of such cheque to said account (iii) the undersigned shall be jointly and severally liable to pay to the Bank on demand any overdraft, indebtedness or liability to the Bank in respect of said account with interest thereon and (iv) in the case of a PERSONAL CHEQUING ACCOUNT, every statement of such account which is mailed by the Bank, together with the relative cheques and vouchers, to the undersigned at the last known post office address of the undersigned, according to the records of the branch holding this card, shall be conclusive evidence that the balance shown thereon is correct and shall be binding on the undersigned save as to payments made on forged or unauthorized endorsements and save as to any errors or omissions notified in writing to the Bank by the undersigned within thirty days after date of mailing.

(1) SIGNATURE

(2) SIGNATURE

FORM 144-78

DATE

Deposit slip: A deposit slip must be completed with the same writing style and signature as that shown on the signature card. The slip contains the following information: date, cash (coins and bills), cheques, account number, and depositor's name.

Example of a deposit slip:

Scotiabank
THE BANK OF NOVA SCOTIA

DEPOSIT

CASH

CHEQUES/ COUPONS

DATE

DEPOSITOR'S INITIALS

SUB TOTAL

SIGNATURE - CASH RECEIVED

LESS CASH

BRANCH NO.

ACCOUNT NO.

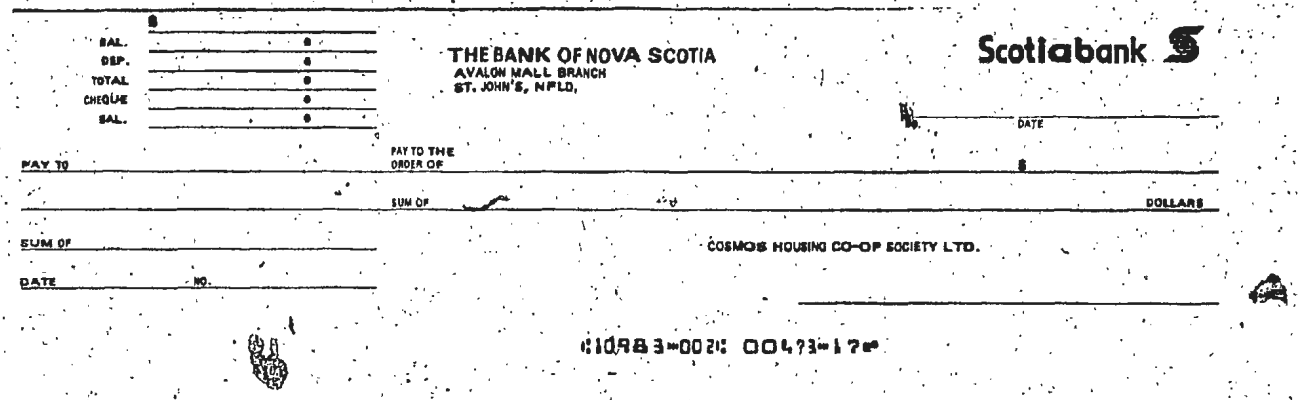
NAME - (PLEASE PRINT)

AMOUNT

$

Chequebook: The bank gives each chequing account depositor a chequebook. These chequebooks come in either a small folding form (for pocket or purse) or a larger form (for desk or office use). The depositor is also given a monthly statement from the bank which lists all deposits/withdrawals that have been made, as well as any cheques that have been written on the account.

The business chequebook has a stub attached to the left of each cheque. This stub is used to record the following data: balance in the account, any deposits that have been made since the last cheque was written, the person to whom the cheque is written, the purpose of the cheque, the amount of the cheque, and the date. For a personal chequing account, this same type of information is recorded in a small "book" issued with the chequebook. Example of a business cheque:



The drawer of a cheque is the person who writes the cheque. The drawee of a cheque is the bank on which the cheque is drawn. The payee is the person or business to whom the cheque is made payable.



Endorsement of a cheque: Before the bank will accept a cheque for cash or deposit, the payee must endorse it by signing his name across the back of the left-hand end of the cheque. There are three basic types of endorsements. First, a blank endorsement makes the cheque payable to anyone who may have it in his possession. Second, a full endorsement makes the cheque payable to a particular person. This person must endorse it before he can present it to the bank for cash or deposit. Third, a restrictive endorsement limits or restricts the use of the cheque to a particular purpose. For example, the cheque might state that is is for deposit only to a certain account.

Bank statement: Periodically, (usually once a month) or upon request, the bank furnishes a statement of the depositor's account. This shows the balance brought forward from the previous statement, the deposits made, the cheques written and presented to the bank for payment, and the balance or money remaining in the account.

Occasionally, some of the cheques written have not been presented for payment by the time the statement is made. The bank includes all the cheques for which payments have been made when it sends the statement. By comparing the statement to the chequebook stubs, it can be readily seen what cheques said to be outstanding, have not been returned to the bank for payment. To get the chequebook balance to agree with the bank statement, it is necessary to subtract the sum of the outstanding cheques from the chequebook

balance and add the sum of any deposits that are not shown on the statement. This is called reconciling the bank balance.

Example: Bank Statement Balance $1365.38

Cheques outstanding:

268 ..... $13.80

275 ..... 58.60 72.40

$1292.98

Deposits outstanding:

May 19 ..... $215.20 ..... 215.20

Adjusted Balance $1508.18

Exercise -- Problems

(1) Reconcile the following bank balance:

Bank Statement Balance $2043.68

Cheques Outstanding:

68 ..... $14.50

92 ..... 115.20

93 ..... 220.00

95 ..... 69.73

(2) Reconcile the following bank balance:

Bank Statement Balance - $3601.54; Cheques Outstanding:

103 - $16.85, # 112 - $147.08, # 113 - $285.00, # 116 - $89.69,

120 - $407.87; Deposits: $155.65, $461.92

(3) Reconcile the following bank balance:

Bank Statement Balance - $895.10; Cheques Written: # 131 - $25.18, # 132 - $162.30, # 133 - $255.01, # 134 - $34.95, # 135 - $6.15; Deposits: $460.33, $254.86. Cheques # 132, # 133 and # 135 are still outstanding.

(4) Miss Anderson's cheque stub balance on June 5 was $322.84. That week she wrote the following cheques: # 76 for $37.50, # 77 for $9.64, and # 78 for $24.68. The following week she deposited $70.00 and wrote the following cheques: # 79 for $11.70 and # 80 for $42.80. She received a bank statement showing a balance of $291.20. Which cheque had not been cashed?

ASK YOUR INSTRUCTOR FOR

THE FINAL (SUMMATIVE) EXAM ON

MODULE 6.

APPENDIX G

Module 7--Insurance

MODULE 7

MATHEMATICS FOR

BEAUTY CULTURE APPRENTICES

INSURANCE

Objectives

Upon successful completion of this module you will be able to:

1. Understand what is meant by the term insurance.
2. Understand the following terms: policy, face value of a policy, term of a policy, policy holder, premium, short-rate scale.
3. Describe some of the various different kinds of insurance and their purposes.
4. Calculate simple fire insurance premiums.

Materials

Notebook, pen or pencil.

References

1. Mathematics of Business
2. Business and Consumer Mathematics
3. Essentials of Business Mathematics

Instructions

1. Carefully read and study the material contained in each section.
2. Solve (correctly) all problems given in each section before moving on to the next section.
3. When you encounter difficulty in solving a problem, please consult with your instructor.
4. After you have completed the entire module, ask your instructor for the final (summative) examination on the whole module. If you do not achieve 75% on this examination, then you are to consult with your instructor who will provide you with additional help. You are given only two opportunities to score 75%. If you fail to do so in both attempts, then you will move on to the next module anyway.

SECTION A

INSURANCE TERMS

Explanation: Insurance is a written agreement by an insurance company to pay for losses or damages according to the conditions stated in the agreement. The insurance company accepts risks for others because it can spread the risk. For example, it is unlikely that all of the thousands of homes an insurance company protects against the risk of fire will burn at one time.

The policy is the written contract or agreement. The face value of the policy is the amount of money to be paid in case of loss or damage. The policy holder is the party insured. The term of the policy is the length of time the policy is in force.

Premiums are payments made by the insured party for protection against loss and/or damage. The amount of each premium varies with the type of insurance and the amount of risk taken. Naturally, the greater the risk, the more the insured party must pay. Premiums are paid at regular intervals as specified in the policy.

Insurance companies invest the premiums paid by their customers. In this way the company accumulates surplus money with which to pay claims. In many cases, an insured person will pay premiums indefinitely and never have a loss, as in the case of fire insurance. He is merely paying for protection just in case he should lose all his possessions due to a fire.

Exercise

1. Explain each of the following terms:

   (a) insurance
   (b) policy
   (c) face value
   (d) policy holder
   (e) term
   (f) premium

2. How can insurance companies affort to stay in business?

SECTION B

KINDS OF INSURANCE

Explanation: There are many different kinds of insurance. The cosmetologist should be familiar with the important ones for his/her own protection. Several of these are discussed in this section.

Life insurance is a form of insurance that pays the stated amount of money (face value) in case of accident, sickness or death. There are four main types of life insurance: (1) straight life requires the payment of a premium each year until the insured person dies, at which time the beneficiary collects the stated value of the policy; (2) term insurance protects the purchaser for a specified period of time, at the end of which the policy expires and can be converted to another type of policy (at a higher premium); (3) limited payment life requires the insured person to make payments for a limited number of years, after which the policy is paid up and no further premiums are required; (4) endowment policies accumulate money, the face value of which will be paid to the insured person at the end of a specified amount of time or to the beneficiary if the insured person dies before the policy matures.

Fire insurance is an insurance whereby the company pays the policy holder for losses caused by accidental fires. The face value of the policy is rarely ever more than 80% of the value of the property. For example, if a property is valued at $10 000.00, then the maximum amount of fire insurance obtainable would be $8 000.00.

Automobile insurance is made up of three main types: (1) public liability and property damage, which covers personal injury

and damage to the property of others; (2) collision or upset, which covers damage to one's own car; (3) comprehension, which covers glass breakage, fire and vandalism.

Exercise

1. Write a short paragraph (in your own words) describing each of the following:

   (a) life insurance (b) fire insurance

   (c) automobile insurance

SECTION C

CALCULATION OF FIRE INSURANGE PREMIUMS

Explanation: Fire insurance rates are usually stated in terms of a dollar value per $100 of insurance. These rates are multiplied by the amount to be insured to find the premium.

Example: The rate for insuring a brick building is $.345 per hundred. Determine the annual premium for $25 000 of insurance.

Solution: Step 1 - Determine how many hundreds are in $25 000.

$25 000 ÷ $100 = 250

Step 2 - Multiply by the rate per $100.

250 x $.345 = $86.25 = annual premium

Exercise - Problems

1. What is the annual premium for a $36 000 fire insurance policy if the rate is $.562 per $100?

2. A business block in which a beauty salon is located is insured for $60 000. Find the annual premium if the rate is $1.20 per $100.

3. A cosmetologist insures her home for $42 000 at the rate of $.75 per $100. Find the annual premium.

4. The rate of fire insurance on a frame (wooden) building is $.784 per $100. How much will the annual premium be if the building is insured for $12 000?

5. Ms. Lynch's beauty salon was insured for $30 000 and the merchandise for $10 000. The insurance rate was $.97 per $100 on the beauty salon and $1.25 per $100 on the merchandise. Find the premium paid.

ASK YOUR INSTRUCTOR FOR

THE FINAL (SUMMATIVE) EXAM ON

MODULE 7.

APPENDIX H

Student Evaluation Record "A"

STUDENT EVALUATION RECORD "A" (TO BE KEPT BY STUDENT)

MODULE- _____

SECTION	DATE AND MARK	DATE AND MARK

APPENDIX I

Student Evaluation Record "B"

STUDENT EVALUATION RECORD "B" (TO BE KEPT BY INSTRUCTOR)

STUDENT _____

MODULE _____

DATE	MARK IN EACH SECTION										OVERALL MARK
	A	B	C	D	E	F	G	H	I	J	

APPENDIX J

Formative Examinations

MODULE 1

SECTION A

EXAM 1

NAME _____

DATE _____

1. Add: 475
216
820
793
(Value 1)

2. Add: $6205.19
12.42
437.88
95.21
(Value 1)

3. Mr. Fleck's daily services amounted to the following:

Monday - $92.50, Tuesday - $123.15, Thursday - $145.80, Friday - $207.20, Saturday - $200.25. How much did Mr. Fleck take in for services for the week? (Value 1)

4. Ms. Young sold the following cosmetics in February:

first week - $32.50, second week - $20.15, third week - $54.65, fourth week - $28.90. Find the monthly total. (Value 1)

5. Mrs. Holt wrote cheques for the following items:

rent - $475.00, electricity - $135.85, towels - $38.50, supplies - $57.92. How much was paid by cheque? (Value 1)

MODULE 1

SECTION A NAME _____

EXAM 2 DATE _____

1. Add: 285
416
(Value 1) 930
642

2. Add: $7306.51
19.28
(Value 1) 293.75
84.92

3. Ms. Laker's daily services amounted to the following: Monday - $120.40, Tuesday - $146.15, Wednesday - $139.20, Thursday - $186.45, Friday - $228.90. How much did Ms. Laker take in for services for the week? (Value 1)

4. Mr. Jones sold the following cosmetics in November: first week - $30.80, second week - $26.15, third week - $54.95, fourth week - $46.00. Find the monthly total. (Value 1)

5. Mrs. White made the following cash payments: cleaning supplies - $20.25, mail - $5.20, combs - $18.50, brushes - $26.25. How much money did she pay out? (Value 1)

MODULE 1

SECTION B

EXAM 1

NAME _____

DATE _____

Subtract each of the following (each has a value of 1):

1. $\begin{array}{r} 75 \\ -38 \\ \hline \end{array}$

2. $\begin{array}{r} 452 \\ -\ 63 \\ \hline \end{array}$

3. $\begin{array}{r} 2478 \\ -\ 1869 \\ \hline \end{array}$

4. $\begin{array}{r} 8531 \\ -\ 829 \\ \hline \end{array}$

5. $\begin{array}{r} 647\ 213 \\ -\ 58\ 324 \\ \hline \end{array}$

MODULE 1

SECTION B NAME _____

EXAM 2 DATE _____

1. Subtract each of the following (Value: 1 each):

(a) $\begin{array}{r} 86 \\ -59 \\ \hline \end{array}$ (b) $\begin{array}{r} 564 \\ -75 \\ \hline \end{array}$ (c) $\begin{array}{r} 4618 \\ -3725 \\ \hline \end{array}$

(d) $\begin{array}{r} 7642 \\ -836 \\ \hline \end{array}$ (e) $\begin{array}{r} 564\,986 \\ -75\,097 \\ \hline \end{array}$

MODULE 1

SECTION C

EXAM 1

NAME _____

DATE _____

1. Mr. Roberts presented his client with a check listing the following services: shampoo and blow dry - $14.50, manicure - $6.00, scalp treatment - $9.75.

   (a) Find the total amount of the check. (Value 1)

   (b) The client pays with a $50.00 bill. Using the "Austrian Method", explain how Mr. Roberts makes the change. (Value 1)

   (c) How much change does the client receive from her $50.00 ? (Value 1)

2. Ms. Diamond has services amounting to $18.75. She bought a comb for $2.50 and a jar of hand cream for $1.15.

   (a) What is the total of her bill? (Value 1)

   (b) Count out her change from three $10.00 bills. (Value 1)

MODULE 1

SECTION C NAME _____

EXAM 2 DATE _____

1. Mrs. French had the following services performed: shampoo and blow dry - $12.50, manicure - $8.00, scalp treatment - $10.75.

   (a) What is the total amount of her bill? (Value 1)

   (b) How much change did she receive from two $20.00 bills? (Value 1)

2. Miss Flight had services amounting to $14.25. She bought a brush for $2.75 and a jar of hand cream for $1.35.

   (a) What is the total amount of her bill? (Value 1)

   (b) Count out her change from a $20.00 bill. (Value 1)

MODULE 1 NAME _____

SECTION D DATE _____

EXAM 1

1. Multiply: 469
   (Value 1) x37

2. Multiply: 2586
   (Value 1) x430

3. Miss Wood bought the following items for her beauty salon:
   1 doz. jars of hand cream at $.96 each, 2 doz. combs at $1.95 each, 2½ doz. bottles of setting lotion at $1.25 each. What is the total amount of her bill? (Value 4)

4. Mrs. Anderson paid Mr. Wong $160.00 per week to start. Mr. Wong's services amounted to $243.00 in the first week and $298.50 in the second week. How much did Mrs. Anderson lose on salary paid to Mr. Wong in the first two weeks of work? (Value 2)

MODULE 1

SECTION D NAME _____

EXAM 2 DATE _____

1. Multiply: 386
x42

(Value 1)

2. Multiply: 3245
x280

(Value 1)

3. Miss Janes bought the following for her beauty salon: 10 jars of hand cream at $.89 per jar, 3 dozen brushes at $2.25 each, 1½ dozen lipstick at $1.79 each. What is the total amount of her bill? (value 4)

4. Mr. Williams paid Ms. Berry $180.00 per week to start. Ms. Berry's services amounted to $289.15 in the first week and $312.80 in the second week. How much did Mr. Williams lose on salary paid to Ms. Berry in her first two weeks of work? (Value 2)

MODULE 1 NAME _____

SECTION E DATE _____

EXAM 1

1. Divide: 9252 ÷ 36 (Value 1)

2. Divide: 150954 ÷ 362 (Value 1)

3. Ms. Kent bought 8 jars of cleansing cream at $42.00 per dozen, 5 lipsticks at $18.00 per dozen, 9 bottles of hand lotion at $30.00 per dozen, and 7 hair brushes at $28.20 per dozen.

(a) Make a sales slip for the above order. (Value 4)

(b) Find the total cost of the order. (Value 1)

4. Miss Ford pays Mr. Barney $168.00 per week. He works 40 hours per week.

(a) How much does he receive per hour? (Value 1)

(b) Mr. Barney was idle 4 hours and 30 minutes during the week. How much did Miss Ford pay for idle time? (Value 1)

MODULE 1

SECTION E NAME _____

EXAM 2 DATE _____

1. Divide: 6888 ÷ 42 (Value 1)

2. Divide: 130 248 ÷ 268 (Value 1)

3. Mr. King's beauty salon is 48 feet long and 39 feet wide. How much will it cost to cover his floor with new linoleum if he pays $21.95 per square yard? (Value 3)

4. Mrs. Ford bought 5 jars of cleansing cream at $42.00 per dozen, 1 quart of cuticle remover at $36.00 per gallon, 8 lipsticks at $21.00 per dozen, and 4 hair brushes at $30.00 per dozen.

(a) Make a sales slip for the above order. (Value 4)

(b) Find the total cost of the order. (Value 1)

MODULE 2

SECTION A

EXAM 1

NAME _____

DATE _____

1. Raise the following fractions to higher terms (Value: 1 each):

(a) $\frac{4}{6} = \frac{?}{30}$

(b) $\frac{3}{8} = \frac{?}{56}$

(c) $\frac{16}{27} = \frac{?}{135}$

(d) $\frac{5}{9} = \frac{?}{108}$

(e) $\frac{7}{10} = \frac{?}{1000}$

2. Reduce the following fractions to lowest terms (Value: 1 each):

(a) $\frac{16}{18}$

(b) $\frac{75}{90}$

(c) $\frac{140}{210}$

(d) $\frac{66}{132}$

(e) $\frac{380}{400}$

MODULE 2

SECTION A NAME _____

EXAM 2 DATE _____

1. Raise the following fractions to higher terms (Value: 1 each):

(a) $\frac{4}{6} = \frac{?}{36}$ (d) $\frac{4}{25} = \frac{?}{1000}$

(b) $\frac{3}{9} = \frac{?}{117}$ (e) $\frac{5}{8} = \frac{?}{120}$

(c) $\frac{14}{23} = \frac{?}{207}$

2. Reduce the following fractions to lowest terms (Value: 1 each):

(a) $\frac{14}{18}$ (d) $\frac{190}{200}$

(b) $\frac{77}{154}$ (e) $\frac{420}{630}$

(c) $\frac{45}{120}$

MODULE 2

SECTIONS B AND C

NAME _____

EXAM 1

DATE _____

1. Write the following improper fractions as mixed numbers (Value: 1 each):

(a) $\frac{30}{4}$

(b) $\frac{84}{8}$

(c) $\frac{37}{7}$

(d) $\frac{134}{11}$

(e) $\frac{126}{8}$

2. Write the following mixed numbers as improper fractions (Value: 1 each):

(a) 6 2/3

(b) 15 1/8

(c) 23 3/11

(d) 35 3/4

(e) 149 1/2

MODULE 2

SECTIONS B AND C NAME _____

EXAM 2 DATE _____

1. Write the following improper fractions as mixed numbers (Value: 1 each):

(a) $\frac{30}{8}$

(b) $\frac{63}{6}$

(c) $\frac{65}{9}$

(d) $\frac{168}{15}$

(e) $\frac{63}{4}$

2. Write the following mixed numbers as improper fractions (Value: 1 each):

(a) 4 1/3

(b) 18 2/5

(c) 13 3/8

(d) 45 1/4

(e) 219 1/2

MODULE 2

SECTION D

NAME _____

EXAM 1

DATE _____

1. Find the least common denominator of each of the following (Value: 1 each):

(a) $\frac{2}{3}, \frac{3}{4}$

(b) $\frac{13}{18}, \frac{7}{8}$

(c) $\frac{4}{5}, \frac{1}{2}, \frac{7}{12}$

(d) $\frac{2}{3}, \frac{3}{4}, \frac{1}{8}$

(e) $\frac{5}{16}, \frac{11}{30}, \frac{15}{32}$

(f) $\frac{1}{4}, \frac{2}{7}, \frac{3}{8}, \frac{5}{14}$

(g) $\frac{1}{8}, \frac{2}{9}, \frac{5}{12}$

MODULE 2

SECTION D NAME _____

EXAM 2 DATE _____

1. Find the least common denominator of each of the following (Value: 1 each):

(a) $\frac{1}{3}, \frac{3}{4}$

(b) $\frac{11}{18}, \frac{5}{6}$

(c) $\frac{3}{5}, \frac{1}{2}, \frac{7}{20}$

(d) $\frac{2}{3}, \frac{1}{4}, \frac{4}{9}$

(e) $\frac{5}{8}, \frac{7}{15}, \frac{15}{16}$

(f) $\frac{3}{4}, \frac{5}{7}, \frac{11}{12}, \frac{3}{14}$

(g) $\frac{1}{2}, \frac{1}{5}, \frac{1}{6}, \frac{1}{12}$

MODULE 2

SECTIONS E AND F

EXAM 1

NAME _____

DATE _____

Find the sum for each of the following (Value: 1 each):

1. $\frac{7}{18} + \frac{11}{12}$

2. $6\frac{1}{2} + 3\frac{2}{3}$

3. $\frac{1}{2} + \frac{3}{16} + \frac{3}{4}$

4. $5\frac{2}{3} + 2 + 4\frac{1}{4}$

5. $\frac{2}{9} + \frac{4}{27} + \frac{1}{3}$

6. $2\frac{3}{5} + \frac{5}{6} + 9\frac{3}{10}$

7. $\frac{11}{16} + \frac{3}{18} + \frac{7}{12}$

8. $3\frac{1}{2} + 4 + \frac{11}{12} + 5\frac{1}{6}$

MODULE 2

SECTIONS E AND F NAME _____

EXAM 2 DATE _____

1. Find the sum for each of the following (Value: 1 each):

(a) $\frac{5}{12} + \frac{11}{18}$

(b) $5\frac{1}{2} + 6\frac{2}{3}$

(c) $\frac{1}{2} + \frac{3}{4} + \frac{5}{8}$

(d) $4\frac{1}{3} + 6 + 2\frac{1}{6}$

(e) $\frac{2}{7} + \frac{5}{21} + \frac{2}{3}$

(f) $2\frac{3}{5} + \frac{1}{4} + 8\frac{9}{20}$

(g) $\frac{15}{16} + \frac{5}{12} + \frac{7}{18}$

(h) $4\frac{1}{2} + 5 + \frac{9}{10} + 3\frac{3}{5}$

MODULE 2

SECTION G

EXAM 1

NAME _____

DATE _____

Subtract each of the following (Value: 1 each):

1. $\frac{5}{8} - \frac{9}{16}$

2. $\frac{7}{12} - \frac{1}{4}$

3. $\frac{3}{5} - \frac{24}{75}$

4. $5\frac{2}{3} - 3\frac{1}{2}$

5. $10\frac{3}{4} - 6\frac{1}{3}$

6. $4\frac{1}{5} - 2\frac{1}{4}$

7. $35\frac{2}{3} - 21\frac{11}{12}$

MODULE 2

SECTION G NAME _____

EXAM 2 DATE _____

1. Subtract each of the following (Value: 1 each):

(a) $\frac{5}{7} - \frac{9}{14}$

(b) $\frac{9}{16} - \frac{1}{4}$

(c) $\frac{11}{15} - \frac{14}{75}$

(d) $6\frac{3}{4} - 4\frac{1}{3}$

(e) $25\frac{2}{3} - 8\frac{1}{6}$

(f) $8\frac{1}{6} - 6\frac{1}{5}$

(g) $48\frac{1}{6} - 34\frac{11}{18}$

MODULE 2

SECTION H NAME _____

EXAM 1 DATE _____

Multiply each of the following (Value: 1 each):

1. $\frac{3}{5} \times \frac{2}{3}$

2. $\frac{5}{6} \times \frac{3}{4}$

3. $5 \times \frac{6}{7}$

4. $2\frac{1}{3} \times \frac{1}{6}$

5. $4\frac{3}{8} \times 2\frac{1}{4}$

6. $\frac{5}{8} \times \frac{4}{5} \times \frac{2}{9}$

7. $2 \times 5\frac{2}{5} \times 2\frac{1}{2}$

8. $4\frac{2}{3} \times 3\frac{1}{4} \times \frac{3}{7}$

MODULE 2

SECTION H NAME _____

EXAM 2 DATE _____

1. Multiply each of the following (Value: 1 each):

(a) 4/5 x 3/4

(b) 7/8 x 4/5

(c) 6 x 4/7

(d) 3 1/4 x 1/8

(e) 5 3/4 x 2 1/8

(f) 3/8 x 4/7 x 7/11

(g) 3 x 2 2/3 x 5 1/5

(h) 4 1/5 x 3 1/4 x 5/7

MODULE 2

SECTION I NAME _____

EXAM 1 DATE _____

1. Divide each of the following (Value: 1 each):

(a) 2/5 ÷ 2/3

(b) 4/15 ÷ 2/3

(c) 3 ÷ 1/4

(d) 6 3/4 ÷ 2 5/8

(e) 4 1/6 ÷ 1 5/6

2. Ms. Hollett bought the following supplies for her shop:

1 3/4 dozen bottles of setting lotion at $15.00 per dozen;

1 1/3 dozen jars of cream at $27.00 per dozen;

2 1/2 dozen tints at $37.80 per dozen;

3/4 dozen lipstick at $33.00 per dozen.

(a) How many dozen items did she buy? (Value 1)

(b) Find the cost of the above order. (Value 4)

MODULE 2

SECTION I NAME _____

EXAM 2 DATE _____

1. Divide each of the following (Value: 1 each):

(a) 3/4 ÷ 3/8

(b) 8/15 ÷ 4/5

(c) 9 ÷ 1/8

(d) 4 2/3 ÷ 2 1/12

(e) 6 1/7 ÷ 2 3/7

2. (a) How many capes can be made from 63 yards of material if it takes 2 1/4 yards for one cape? (Value 2)

(b) How much will each of the above capes cost at $16.80 per yard? (Value 2)

MODULE 3

SECTIONS A, B AND C NAME _____

EXAM 1 DATE _____

1. Write each of the following decimals as a common fraction (Value: 1 each):

(a) .6

(b) .04

(c) .225

(d) .18

(e) 5.75

2. Change each of the following to decimals and round off to three places (Value: 1 each):

(a) 5/8

(b) 1/3

(c) 3/4

(d) 17/18

(e) 22/37

MODULE 3

SECTIONS A, B AND C NAME _____

EXAM 2 DATE _____

1. Change each of the following decimals to common fractions (Value: 1 each):

(a) .4

(d) .16

(b) .08

(e) 8.2

(c) .425

2. Change each of the following to decimals and round off to three places (Value: 1 each):

(a) 1/8

(d) 14/15

(b) 5/6

(e) 33/34

(c) 3/5

MODULE 3

SECTIONS D AND E NAME _____

EXAM 1 DATE _____

1. Add each of the following (Value: 1 each):

(a) 16.32 + 8.28

(b) 4.03 + 9 + 12.2

(c) 25.29 + 16.3 + 12.621

(d) 4.88 + 35 + 19.2 + .065

(e) 161.58 + 73.86 + 2.4 + 18

2. Subtract each of the following (Value: 1 each):

(a) 19.88 - 15.61

(b) 25.16 - 24.28

(c) 59.72 - 23.946

(d) 4.06 - .006

(e) 89.4 - 43.125

MODULE 3

SECTIONS D AND E

EXAM 2

NAME _____

DATE _____

1. Add each of the following (Value: 1 each):

(a) 28.41 + 9.39

(b) 15.13 + 8 + 126.3

(c) 8.46 + 14.2 + 3.899

(d) 5.62 + 19 + 6.5 + .128

(e) 243.67 + 53.88 + 9.6 + .66

2. Subtract each of the following (Value: 1 each):

(a) 32.76 - 21.42

(b) 8.58 - 7.69

(c) 86.25 - 41.386

(d) 29.04 - .009

(e) 38.8 - 9.265

MODULE 3

SECTIONS F AND G NAME _____

EXAM 1 DATE _____

1. Multiply each of the following (Value: 1 each):

(a) 2.56 x 4.1 (b) 136.5 x 4.9

2. Divide each of the following (Value: 1 each):

(a) 12.3 ÷ 4.7 (b) 21.23 ÷ 98.7

3. A salesman for beauty supplies sold a quantity of shampoo granules and received $352.00 for selling them.

(a) If his commission was $.44 per pound, how many pounds did he sell? (Value 2)

(b) The price per pound was $2.40. What was the total value of the granules? (Value 2)

4. Miss Joy worked in a beauty salon from 9:00 a.m. to 5:00 p.m. with one hour off for lunch. At $4.10 per hour, how much did she earn in five days? (Value 2)

MODULE 3

SECTIONS F AND G NAME _____

EXAM 2 DATE _____

1. Multiply each of the following (Value: 1 each):

   (a) 4.62 x 8.7 (b) 16.3 x 246.5

2. Divide each of the following (Value: 1 each):

   (a) 3.5 ÷ .001 (b) 19.26 ÷ .031

3. (a) If combs cost $1.80 each, how many dozen combs can be bought for $75.60? (Value 2)

   (b) The selling price is $2.25 per comb. How much profit is made if all the combs are sold? (Value 2)

4. Mr. Topp works in a beauty salon from 9:30 a.m. to 9:30 p.m. with one hour off for lunch and one hour off for supper. At $5.25 per hour, how much does he earn in six days? (Value 2)

MODULE 4

SECTIONS A AND B NAME _____

EXAM 1 DATE _____

1. Change the following decimal numbers to percents (Value: 1 each):

(a) 0.35

(d) 4.83

(b) 0.218

(e) 0.0008

(c) 0.046

2. Change the following percents to decimal numbers (Value: 1 each):

(a) 6%

(d) 450%

(b) 40%

(e) 23.19%

(c) 0.5%

MODULE 4

SECTIONS A AND B NAME _____

EXAM 2 DATE _____

1. Change the following decimal numbers to percents (Value: 1 each):

(a) 0.55

(d) 0.007

(b) 2.65

(e) 23.59

(c) 0.826

2. Change the following percents to decimal numbers (Value: 1 each):

(a) 8%

(d) 25.4%

(b) 60%

(e) 238%

(c) 0.2%

MODULE 4

SECTIONS C AND D NAME _____

EXAM 1 DATE _____

1. Change the following to percents (Value: 1 each):

(a) 1/4

(d) 7/50

(b) 5/8

(e) 6 9/40

(c) 3 1/3

2. Change the following percents to common fractions and reduce to lowest terms (Value: 1 each):

(a) 22%

(d) ¼%

(b) 4%

(e) 120%

(c) 37½%

MODULE 4

SECTIONS C AND D NAME _____

EXAM 2 DATE _____

1. Change the following to percents (Value: 1 each):

(a) 3/8

(b) 2/5

(c) 7/16

(d) 5 3/4

(e) 1/40

2. Change the following percents to common fractions and reduce to lowest terms (Value: 1 each):

(a) 15%

(b) 31⅓%

(c) 8%

(d) 25 2/3%

(e) 360%

MODULE 4

SECTION F NAME _____

EXAM 1 DATE _____

1. Solve each of the following (Value: 1 each):

(a) 40% of 180 (b) 16½% of $80.00

(c) 5% of 24 (d) ½% of $100.00

2. A beauty salon with an income of $137 084.00 for one year had the following expenses: salaries - 45%, rent - 15%, supplies and miscellaneous expenses - 20%.

(a) What were the expenses for the year? (Value 3)

(b) How much did the owner have left for himself? (Value 1)

MODULE 4

SECTION F NAME _____

EXAM 2 DATE _____

1. Solve each of the following (Value: 1 each):

(a) 75% of 240 (b) 14½% of $250.00

(c) 4% of 520 (d) 1/5% of $500.00

2. A beauty salon did $193,500.00 worth of business last year. This year the business increased by 10½%. How much was realized from this year's business? (Value 2)

3. The income of a beauty salon was $46,238.00 for one year. Of this total, 45% was paid out in salaries. How much was paid out in salaries? (Value 2)

MODULE 4

SECTION C NAME _____

EXAM 1 DATE _____

1. Solve each of the following (Value: 1 each):

(a) What percent of 80 is 32? (b) $19.50 is what percent of $54?

(c) What percent of $600. is $75? (d) What percent of $1 100. is $2.25?

2. A beauty salon did $176 900.00 worth of business in one year. The payroll amounted to $127 368.00. What percent of the total income was the payroll? (Value 2)

3. Ms. King spent $4 770.00 to advertise her business last year. The receipts for the year were $63 620.00. What percent of the receipts was spent on advertising? (Value 2)

MODULE 4

SECTION G NAME _____

EXAM 2 DATE _____

1. Solve each of the following (Value: 1 each):

(a) What percent of 6 is 10.5? (b) What percent of 32 is 21?

(b) What percent of $25. is $3,750? (d) Find what percent 130 is of 50.

2. A beauty salon owner bought equipment amounting to $2 640. He paid $1 504.80 as a down payment. What percent of the bill did he pay? (Value 2)

3. A salesman sold supplies to a beauty salon owner amounting to $5 600.00. He received $196.00 for his share of the sale. What percent of the total sale did he receive? (Value 2)

MODULE 4

SECTION H NAME _____

EXAM 1 DATE _____

1. Solve each of the following (Value: 1 each):

(a) 32% of what number is equal to 5.76?

(b) 24% of what number is equal to $3 600.00?

(c) 52 is 5% of what number?

(d) 250% of what number is 90?

2. Mrs. Rose was allowed 4% off her bill for supplies for paying cash. She saved $25.02 on her order. What was the amount of the order? (Value 2)

3. A beauty salon owner ordered supplies. She paid $[illegible].00 which was 35% of the order. What was the amount of the order? (Value 2)

MODULE 4

SECTION H NAME _____

EXAM 2 DATE _____

1. Solve each of the following (Value: 1 each):

(a) 16% of what number is equal to 4?

(b) 36% of what number is equal $225.00?

(c) 125% of what number is 140?

(d) 720 is 45% of what number?

2. Mr. Crick's employer deducted 8% from his salary for union dues. It amounted to $21.20 for one week. What was Mr. Crick's salary for the week? (Value 2)

3. Ms. Small's expenses for one year were $32,760.00 which amounted to 45% of her income. How much was her income for the year? (Value 2)

MODULE 4

SECTION I NAME _____

EXAM 1 DATE _____

1. A beauty supply salesman had sales of $46 500.00 last month. His usual commission is 8%. How much did he earn last month? (Value 2)

2. Mr. Perkins works in a beauty salon where the salary is $135.00 per week and the commission rate is 30% (on sales in excess of double his guaranteed salary). If his sales for two consecutive weeks were $785.50 and 640.20, how much would he earn each week? (Value 4)

3. A beauty supply salesman received $5 100.00 in one month on his sales. His commission is 30% on all sales. Find the total amount of his sales for the month. (Value 2)

MODULE 4

SECTION I NAME _____

EXAM 2 DATE _____

1. A beauty supply salesman had sales of $52 925.80 last month. His commission is 7%. How much did he earn last month? (Value 2)

2. (a) All hair stylists in Mr. Gray's beauty salon receive $150.00 per week plus a 25% commission on their sales (in excess of double their guaranteed salary). Miss Brown, an employee of Mr. Gray, had sales of $765.50 last week. What was her income for the week? (Value 2)

(b) Ms. White also works in Mr. Gray's beauty salon. Her sales last week were $682.40. What was her income for the week? (Value 2)

3. A beauty supply salesman received $7 690.00 in one month on his sales. His commission is 40% on all sales. Find the total amount of his sales for the month. (Value 2)

MODULE 4

SECTION J NAME _____

EXAM 1 DATE _____

1. Mr. Stone bought the following supplies for use in his beauty salon: two gallons shampoo - $37.50; five dozen wave clips - $12.50; two dozen cold wave lotion - $50.40; two pounds hand cream - $8.75. He was given a 12% discount on the order.

   (a) What was the amount of his discount? (Value 3)

   (b) How much did he pay for the order? (Value 1)

2. A hair drying unit costs $89.50. A 25% discount is given if two units are purchased at the same time, while a 35% discount is given if three units are purchased at the same time.

   (a) How much is saved by buying two at the same time? (Value 2)

   (b) How much is saved by buying three at the same time? (Value 2)

MODULE 4

SECTION J NAME _____

EXAM 2 DATE _____

1. Ms. Page ordered the following supplies for her beauty salon: two gallons of shampoo at $18.25 per gallon; five dozen combs at $24.00 per dozen; two pounds of cotton at $3.25 per pound. She was given a 6% discount on the order.

   (a) What was the amount of her discount? (Value 3)

   (b) How much did she pay for the order?

2. Mr. Hale bought eight dozen bottles of permanent wave solution at $25.20 per dozen. He was given a 12% discount on the order. When the order was received, ten bottles were broken for which he did not pay. How much did he pay? (Value 4)

MODULE 4

SECTION K NAME _____

EXAM 1 DATE _____

1. Mrs. White's income from services in her beauty salon for one month was $4 167.95. Her expenses were as follows: salaries - $2 755.00; rent - $1 375.00; electricity and phone - $79.19; laundry - $107.26; supplies - $206.40; miscellaneous expenses - $13.20.

(a) How much were her expenses? (Value 2)

(b) Did she gain or lose and how much? (Value 2)

(c) What was the percent gain or loss? (Value 2)

2. Mr. Tee bought 15 gallons of shampoo at $18.75 per gallon. Through carelessness, 18% of the shampoo was wasted.

(a) How much of the shampoo was wasted? (Value 2)

(b) How much did this waste cost Mr. Tee? (Value 2)

MODULE 4

SECTION K NAME _____

EXAM 2 DATE _____

1. Mr. Black paid $425.15 for an order of cosmetics. He sold them all and received a 60% profit.

   (a) How much did he receive for the cosmetics? (Value 2)

   (b) How much was his gain? (Value 1)

2. Mrs. Brown's expenses for one month were $2 864.00. Her income was $4 439.20. What percent profit did she make on the month's business? (Value 2)

3. A beauty salon charges $67.50 for one type of cold wave. The costs of giving the wave are: salary - $12.00; wave solution - $4.50; other expenses - $8.10.

   (a) What is the cost of each cold wave? (Value 1)

   (b) What percent profit is made on the wave? (Value 2)

MODULE 5

SECTION A NAME _____

EXAM 1 DATE _____

1. Find the interest of each of the following (Value: 2 each):

(a) $840 at 6% for 60 days

(b) $250 at 20% for 1 year

(c) $6500 at 24% for 3 years

(d) $9000 at 18% for 4½ years

2. Mr. Sweet made a personal loan of $2500 to his partner on September 25, at 15% interest. The loan was repaid on February 20. What was the amount of interest paid on the loan? (Value 2)

MODULE 5

SECTION A NAME _____

EXAM 2 DATE _____

1. Find the interest of each of the following (Value: 2 each):

(a) $550 at 8% for 60 days

(b) $640 at 18% for 90 days

(c) $4200 at 22% for 2 years

(d) $8500 at 25% for 3½ years

2. Mrs. Cherry borrowed $3500.00 from the bank on March 15, at 20% interest. If she repaid the loan on October 20, what was the amount of interest she paid? (Value 2)

MODULE 5

SECTION B NAME _____

EXAM 1 DATE _____

1. A beauty salon owner buys a piece of equipment for $1320.00. This is to be paid for in 8 monthly payments after the initial down payment of 1/5 of the price is made. What is the amount of each monthly payment? (Value 3)

2. Mr. Rose bought some equipment that was priced at $5500.00. He paid $1300.00 down and made 12 monthly payments of $450.00 each.

(a) How much more than the cash price did he pay? (Value 3)

(b) What interest rate did he pay on the installment plan? (Value 2)

MODULE 5

SECTION B NAME _____

EXAM 2 DATE _____

1. Ms. Case bought a new piece of equipment priced at $10 880.00. She was allowed $1800.00 trade-in on her old equipment and she paid $800.00 cash. She paid the balance in 24 equal monthly installments. Find the amount of each installment. (Value 3)

2. Mr. Quick bought some new equipment that was priced at $3250.00. He paid $430.00 down and made 12 monthly payments of $300.00 each.

(a) How much more than the cash price did he pay? (Value 3)

(b) What interest rate did he pay on the installment plan? (Value 2)

MODULE 5

SECTION C NAME _____

EXAM 1 DATE _____

1. Mr. Johnson is paid a straight salary of $180.00 a week plus a 12% commission on all cosmetics sales. He sold $93.30 worth of cosmetics in one week, while the income for his services amounted to $416.50

   (a) How much did he actually receive? (Value 3)

   (b) How much profit did Mr. Johnson's employer realize on his services above double his salary? (Value 2)

2. Ms. Moore is paid $160.00 per week plus 40% on all money she earns in excess of $320.00. Her services amounted to $392.50. Her cosmetics sales amounted to $64.00, on which she received a 15% commission.

   (a) How much commission did she receive on both services and sales? (Value 4)

   (b) What is the total amount of salary she received? (Value 1)

MODULE 5

SECTION C NAME _____

EXAM 2 DATE _____

1. Mr. Ash is paid on the commission basis only. He is paid 50% of all money taken in from his services. He also receives a 12% commission on all cosmetics sales. One week his services amounted to $416.80 and his cosmetics sales amounted to $115.50.

   (a) How much commission did he receive on both services and sales? (Value 4)

   (b) What was his salary for the week if he also received $38.15 in tips? (Value 1)

2. Ms. Snow's services for one week amounted to $720.20. Her salary is $160.00 per week plus 30% commission on all money taken in over double her guaranteed salary.

   (a) How much did Ms. Snow receive for the week? (Value 3)

   (b) How much profit did Ms. Snow's employer realize on her services above double her salary? (Value 2)

APPENDIX K

Summative Examinations

MODULE 1

FINAL EXAM

FORM 1

NAME _____

DATE _____

1. Add: $2465.08
   (Value 1) 12.93
   246.20
   84.44

2. Subtract: 6423
   (Value 1) -546

3. Multiply: 562
   x 43
   (Value 1)

4. Divide: 24 702 ÷ 69
   (Value 1)

5. Miss Lake's daily services amounted to the following: Tuesday - $122.50, Wednesday - $138.25, Thursday - $198.20, Friday - $218.75, Saturday - $240.05. How much did Miss Lake take in for services for the week? (Value 1)

6. Mrs. Ball had services amounting to $10.75. She bought a brush for $2.59 and a lipstick for $1.29.

   (a) What is the total amount of her bill? (Value 1)

   (b) Count out her change from a $20.00 bill. (Value 1)

7. Mr. Nolan bought the following for his beauty salon: 3 dozen combs at $15.00 per dozen, 2 dozen setting lotion at $15.60 per dozen, 3 jars hand cream at $11.76 per dozen, and 8 lipsticks at $27.00 per dozen.

(a) Make a sales slip for the above order. (Value 4)

(b) Find the total cost of the order. (Value 1)

MODULE 1

FINAL EXAM

FORM 2

NAME _____

DATE _____

1. Add: $4582.66
394.08
(Value 1) 15.92
668.75

2. Subtract: 3241
- 864
(Value 1)

3. Multiply: 489
x 36
(Value 1)

4. Divide: 26 703 ÷ 43
(Value 1)

5. Mrs. Jamieson sold the following cosmetics in July: first week - $42.15, second week - $53.90, third week - $48.65, fourth week - 46.30. Find the monthly total. (Value 1)

6. Miss Wall had the following services performed: shampoo and blow dry - $10.25, hair cut - $8.00, manicure - $6.50.

(a) What is the total amount of her bill? (Value 1)

(b) How much change did she receive from two $20.00 bills?
(Value 1)

(c) How should her change be counted out? (Value 1)

7. Ms. Crown bought the following items for her beauty salon: 5 combs at $23.40 per dozen, 8 brushes at $37.80 per dozen, 4 bottles of hand lotion at $30.00 per dozen, and 10 jars of cleansing cream at $42.00 per dozen.

(a) Make a sales slip for the above order. (Value 4)

(b) Find the total cost of the order. (Value 1)

MODULE 2

FINAL EXAM NAME _____

FORM 1 DATE _____

1. Solve each of the following (Value: 1 each):

(a) $\frac{4}{7} = \frac{?}{105}$

(b) $\frac{5}{16} + \frac{7}{12}$

(c) 6 1/2 + 4 + 3 2/3

(d) 8 3/4 - 3 4/5

(e) 3 2/5 x 5/12 x 1 1/3

(f) 5 5/6 ÷ 2 1/2

2. Reduce 80/112 to lowest terms. (Value 1)

3. Write 64/5 as a mixed number. (Value 1)

4. Write 16 5/8 as an improper fraction. (Value 1)

5. Find the least common denominator of 2/3 , 3/8 , 4/9 and 5/24. (Value 1)

6. If 4 2/3 yards of terry towel material costs $56.00, how much will 8 1/3 yards cost? (Value 3)

7. Mr. Pardy bought the following supplies for his shop:

   1/2 dozen creams at $29.00 per dozen;

   1 1/3 dozen setting lotions at $15.00 per dozen;

   3/4 dozen tints at $37.80 per dozen;

   2 only hair brushes at $42.00 per dozen.

   (a) How many dozen items did he buy? (Value 1)

   (b) Find the cost of the above order. (Value 4)

MODULE 2

FINAL EXAM NAME _____

FORM 2 DATE _____

1. Solve each of the following (Value: 1 each):

(a) $\frac{7}{9} = \frac{?}{126}$

(b) $\frac{6}{25} + \frac{9}{20}$

(c) 5 1/3 + 8 3/4 + 9

(d) 15 1/4 - 6 5/6

(e) 2 1/2 x 3 1/4 x 1/6

(f) 12 3/5 ÷ 1 13/15

2. Reduce 108/180 to lowest terms. (Value 1)

3. Write 73/4 as a mixed number. (Value 1)

4. Write 12 2/7 as an improper fraction. (Value 1)

5. Find the least common denominator of 5/12, 1/6, 2/5 and 1/2. (Value 1)

6. If hair rollers cost $3.80 per dozen, how much will 6 1/2 dozen cost? (Value 2)

7. Mr. Dodge bought the following supplies for his shop:

   3/4 dozen bottles of setting lotion at $15.00 per dozen;

   2 1/2 dozen jars of cream at $27.00 per dozen;

   2/3 dozen cans of spray lacquer at $30.00 per dozen.

   (a) How many dozen items did he buy? (Value 1)

   (b) Find the cost of the above order. (Value 3)

MODULE 3

FINAL EXAM

FORM 1

NAME _____

DATE _____

1. Write .025 as a common fraction. (Value 1)

2. Write 13/14 as a decimal and round off to three places. (value 1)

3. Add: 2.64 + 15.9 + 263 + 1.093 (Value 1)

4. Subtract: 380.52 - 94.68 (Value 1)

5. Multiply: 15.3 x 8.42 (Value 1)

6. Divide: 1121.4 ÷ 12.6 (Value 1)

7. Ms. Locke receives a salary of $200.00 for a 40 hour work week. She receives $7.50 per hour for each hour overtime she works. She worked 2 1/2 hours overtime on Monday, 3 1/2 hours on Thursday, and 2 hours on Friday.

(a) How much overtime pay did she receive? (Value 2)

(b) She received $41.60 in tips besides her salary. How much did she receive in all for the week? (Value 2)

MODULE 3

FINAL EXAM NAME _____

FORM 2 DATE _____

1. Write .125 as a common fraction. (Value 1)

2. Write 23/27 as a decimal and round off to three places. (Value 1)

3. Add: 8.56 + 29.146 + 329 + 16.8 (Value 1)

4. Subtract: 89.23 - 59.48 (Value 1)

5. Multiply: 18.6 x 4.93 (Value 1)

6. Divide: $303.66 \div 4.82$ (Value 1)

7. A salesman for beauty supplies sold a quantity of shampoo and received $242.00 for selling it.

(a) If his commission was $.44 per pound, how many pounds did he sell? (Value 2)

(b) The price per pound was $2.85 . What was the total value of the shampoo? (Value 2)

MODULE 4

FINAL EXAM NAME _____

FORM 1 DATE _____

1. Change 0.125 to a percent. (Value 1)

2. Change 7% to a decimal number. (Value 1)

3. Change 2/3 to a percent. (Value 1)

4. Change 16% to a common fraction and reduce to lowest terms. (Value 1)

5. Find 20% of $150.00 (Value 1)

6. The income of a beauty salon was $52 425.00 for one year. Of this total, 15% was paid out in rent. How much was paid out in rent? (Value 2)

7. What percent of 48 is 4? (Value 1)

8. 54 is 15% of what number? (Value 1)

9. A beauty salon owner paid $425.00 for 45% of an order of supplies. What was the amount of the order? (Value 2)

10. A beauty supply salesman had sales of $64 500.00 last month. His usual commission is 12%. How much did he earn last month. (Value 2)

11. Mrs. Park bought the following supplies for her beauty salon: three gallons shampoo - $49.50; six dozen wave clips - $15.00; three dozen cold wave lotion - $75.60; one pound hand cream - $4.50. She was given a 15% discount on the order.

(a) What was the amount of her discount? (Value 3)

(b) How much did she pay for the order? (Value 1)

MODULE 4

FINAL EXAM NAME _____

FORM 2 DATE _____

1. Change 2.64 to a percent. (Value 1)

2. Change 0.6% to a decimal number. (Value 1)

3. Change 3/8 to a percent. (value 1)

4. Change 60% to a common fraction and reduce to lowest terms. (Value 1)

5. Find 4% of $225.00. (Value 1)

6. A beauty salon did $115 600.00 worth of business last year. This year the business increased by 8½%. How much was realized from this year's business? (Value 2)

7. Find what percent 50 is of 130. (Value 1)

8. A beauty salon owner bought equipment amounting to $3 450.00. He paid $1 207.50 as a down payment. What percent of the bill did he pay? (Value 2)

9. 125% of what number is 75? (Value 1)

10. A beauty supply salesman received $2 550.00 in one month on his sales. His commission is 40% on all sales. Find the total amount of his sales for the month. (Value 2)

11. Ms. Greene paid $380.25 for an order of cosmetics. She sold them all and received a 70% profit.

(a) How much did she receive for the cosmetics? (Value 2)

(b) How much was her gain? (Value 1)

MODULE 5

FINAL EXAM NAME _____

FORM 1 DATE _____

1. Find the interest of each of the following (Value: 2 each):

   (a) $420 at 6% for 60 days

   (b) $3600 at 24% for 2 years

2. Mr. Good borrowed $1200 from his partner on April 5, at 18% interest. He repaid the loan on November 25. What was the amount of interest he paid? (Value 2)

3. Mrs. Cook bought some equipment that was priced at $4200.00. She paid $1800.00 down and made 12 monthly payments of $250.00 each.

   (a) How much more than the cash price did she pay? (Value 3)

(b) What interest rate did she pay on the installment plan?

(Value 2)

4. Mrs. Lowell is paid $180.00 per week plus 40% on all money she earns in excess of $360.00. Her services amounted to $426.50. Her cosmetics sales amounted to $56.00, on which she received a 15% commission.

(a) How much commission did she receive on both services and sales? (Value 4)

(b) What is the total amount of salary she received? (Value 1)

MODULE 5

FINAL EXAM NAME _____

FORM 2 DATE _____

1. Find the interest of each of the following (Value: 2 each):

   (a) $720 at 8% for 60 days

   (b) $2500 at 18% for 3 years

2. Miss Wood borrowed $3600 from the bank on October 20, at 24% interest. She repaid the loan on January 15. How much interest did she pay? (Value 2)

3. Mr. Slate bought a new piece of equipment for $3400.00. He made a down payment of ¼ of the price and paid the balance in 12 equal monthly installments. Find the amount of each installment. (Value 3)

4. Ms. Barklay is paid a straight salary of $160.00 a week plus a 15% commission on all cosmetics sales. She sold $126.20 worth of cosmetics in one week, while the income from her services amounted to $396.35.

(a) How much did she actually receive? (Value 3)

(b) How much profit did Ms. Barklay's employer realize on her services above double her salary? (Value 2)

MODULE 6

FINAL EXAM NAME _____

FORM 1 DATE _____

1. Draw up a cash account form and write a cash account for the following. Be sure to close the account. (Value 15)

Balance as of October 1 - $650.00; October 1: received in services - $60.25, received from cosmetics sales - $32.80; paid to H.R. Supply Company - $131.80. October 5: received in services - $225.15. October 8: received in services - $264.80, received from cosmetics sales - $37.10; paid out for telephone - $29.85. October 12: received in services - $312.35; received from cosmetics sales - $18.20; paid out for rent - $620.00.

2. Reconcile the following bank balance (Value 4):

Bank Statement Balance - $4601.96; Cheques Outstanding:

215 - $26.95, # 219 - $217.09, # 230 - $185.00, # 231 -

$189.53; Deposits: $295.80, $671.27.

MODULE 6

FINAL EXAM NAME _____

FORM 2 DATE _____

1. Draw up a cash account form and write a cash account for the following. Be sure to close the account. (Value 15)

Balance as of June 1 - $2475.78; June 4: income from services - $701.25, income from cosmetics sales - $64.40. June 6: paid out for plumbing - $89.15, paid out for supplies - $182.50. June 10: income from services - $986.35; paid out for supplies - $39.22, paid out for roof repairs - $155.00. June 12: income from services - $1382.40, income from cosmetics sales - $59.25; paid out for taxes - $218.20.

2. Reconcile the following bank balance (Value 4):

Bank Statement Balance - $215.28; Cheques Outstanding: # 301 - $18.27; # 304 - $59.15, # 306 - $112.45, # 312 - $9.58; Deposits: $198.24, $458.60.

MODULE 7

FINAL EXAM NAME _____

FORM 1 DATE _____

1. Explain each of the following (Value: 2 each):

(a) policy

(b) premium

(c) life insurance

2. What is the annual premium for a $45 000 fire insurance policy if the rate is $.625 per $100? (Value 2)

3. A cosmetologist insures her home for $82 000 at the rate of $.65 per $100. Find the annual premium. (Value 2)

MODULE 7

FINAL EXAM NAME _____

FORM 2 DATE _____

1. Explain each of the following (Value: 2 each):

(a) policy holder

(b) face value

(c) automobile insurance

2. Miss Locke's beauty salon was insured for $40 000 and the merchandise for $18 000. The insurance rate was $.89 per $100 on the beauty salon and $1.32 per $100 on the merchandise. Find the premium paid. (Value 4)

APPENDIX L

Solutions to Formative Examinations

SOLUTIONS

MODULE 1 - EXAMS

SECTION A - EXAM 1

1. 2304 2. $6750.70 3. $768.90

4. $136.20 5. $707.27

SECTION A - EXAM 2

1. 2275 2. $7704.46 3. $821.10

4. $157.90 5. $70.20

SECTION B - EXAM 1

1. 37 2. 389 3. 609

4. 7702 5. 588 889

SECTION B - EXAM 2

1. 27 2. 489 3. 893

4. 6806 5. 489 889

SECTION C - EXAM 1

1. (a) $30.25 (b) three 25 cent pieces to make $31.00; two 2 dollar bills to make $35.00; one 5 dollar bill to make $40.00; one 10 dollar bill to make $50.00

(c) $19.75

2. (a) $22.40 (b) one 10 cent piece; two 25 cent pieces; one 2 dollar bill; one 5 dollar bill.

SOLUTIONS

MODULE 1 - EXAMS

SECTION C - EXAM 2

1. (a) $31.25 (b) $18.75 (c) three 25 cent pieces; one 1 dollar bill; one 2 dollar bill; one 5 dollar bill; one 10 dollar bill.

2. (a) $18.35 (b) one 5 cent piece; one 10 cent piece; two 25 cent pieces; one 1 dollar bill.

SECTION D - EXAM 1

1. 17 353 2. 1 111 980

3. $95.82 4. $98.50

SECTION D - EXAM 2

1. 16 212 2. 908 600

3. $122.12 4. $118.05

SECTION E - EXAM 1

1. 257 2. 417

3. (a) 8 jars cleansing cream ---------- $28.00
5 lipsticks ---------- 7.50
9 bottles hand lotion ---------- 22.50
7 hair brushes ---------- 16.45

(b) $74.45

4. (a) $4.20 (b) $18.90

SOLUTIONS

MODULE 1 - EXAMS

SECTION E - EXAM 2

1. 164 2. 486

3. $4565.60

4. (a) 5 jars cleansing cream ---------- $17.50
1 quart cuticle remover ---------- 9.00
8 lipsticks ---------- 14.00
4 hair brushes ---------- 10.00

(b) $50.50

SOLUTIONS

MODULE 2 - EXAMS

SECTION A - EXAM 1

1. (a) 20 (b) 24 (c) 80
   (d) 60 (e) 700
2. (a) 8/9 (b) 5/6 (c) 2/3
   (d) 1/2 (e) 19/20

SECTION A - EXAM 2

1. (a) 24 (b) 39 (c) 126
   (d) 160 (e) 75
2. (a) 7/9 (b) 1/2 (c) 3/8
   (d) 19/20 (e) 2/3

SECTIONS B AND C - EXAM 1

1. (a) 7 1/2 (b) 10 1/2 (c) 5 2/7
   (d) 12 2/11 (e) 15 3/4
2. (a) 20/3 (b) 121/8 (c) 256/11
   (d) 143/4 (e) 299/2

SECTIONS B AND C - EXAM 2

1. (a) 3 3/4 (b) 10 1/2 (c) 7 2/9
   (d) 11 1/5 (e) 15 3/4
2. (a) 13/3 (b) 92/5 (c) 107/8
   (d) 181/4 (e) 439/2

SOLUTIONS

MODULE 2 - EXAMS

SECTION D - EXAM 1

1. (a) 12 (b) 72 (c) 60 (d) 24

(e) 480 (f) 56 (g) 72

SECTION D - EXAM 2

1. (a) 12 (b) 18 (c) 20 (d) 36

(e) 240 (f) 84 (g) 60

SECTIONS E AND F - EXAM 1

1. 1 11/36 2. 10 1/6 3. 1 7/16 4. 11 11/12

5. 19/27 6. 12 11/15 7. 1 7/16 8. 13 7/12

SECTIONS E AND F - EXAM 2

1. (a) 1 1/36 (b) 12 1/6 (c) 1 7/8 (d) 12 1/2

(e) 1 4/21 (f) 11 3/10 (g) 1 107/144 (h) 14

SECTION G - EXAM 1

1. 1/16 2. 1/3 3. 7/25 4. 2 1/6

5. 4 5/12 6. 1 19/20 7. 13 3/4

SECTION G - EXAM 2

1. (a) 1/14 (b) 5/16 (c) 41/75 (d) 2 5/12

(e) 17 1/2 (f) 1 29/30 (g) 13 5/9

SOLUTIONS

MODULE 2 - EXAMS

SECTION H - EXAM 1

1. 2/5 2. 5/8 3. 4 2/7 4. 7/18

5. 9 27/32 6. 1/9 7. 27 8. 6 1/2

SECTION H - EXAM 2

1. (a) 3/5 (b) 7/10 (c) 3 3/7 (d) 13/32

(e) 12 7/32 (f) 3/22 (g) 41 3/5 (h) 9 3/4

SECTION I - EXAM 1

1. (a) 3/5 (b) 2/5 (c) 12

(d) 2 4/7 (e) 2 3/11

2. (a) 6 1/3 (b) $181.50

SECTION I - EXAM 2

1. (a) 2 (b) 2/3 (c) 72

(d) 2 6/25 (e) 2 9/17

2. (a) 28 (b) $37.80

SOLUTIONS

MODULE 3 - EXAMS

SECTIONS A, B AND C - EXAM 1

1. (a) 3/5 (b) 1/25 (c) 9/40 (d) 9/50 (e) 5 3/4

2. (a) .625 (b) .333 (c) .75 (d) .944 (e) .595

SECTIONS A, B AND C - EXAM 2

1. (a) 2/5 (b) 2/25 (c) 17/40 (d) 4/25 (e) 8 1/5

2. (a) .125 (b) .833 (c) .6 (d) .933 (e) .971

SECTIONS D AND E - EXAM 1

1. (a) 24.60 (b) 25.23 (c) 54.211
   (d) 59.145 (e) 255.84

2. (a) 4.27 (b) .88 (c) 35.774
   (d) 4.054 (e) 46.275

SECTIONS D AND E - EXAM 2

1. (a) 37.80 (b) 149.43 (c) 26.559
   (d) 31.248 (e) 373.15

2. (a) 11.34 (b) .89 (c) 44.864
   (d) 29.031 (e) 29.535

SECTIONS F AND G - EXAM 1

1. (a) 10.496 (b) 668.85 2. (a) 2.617 (b) .215

3. (a) 800 (b) $1920.00 4. $143.50

SECTIONS F AND G - EXAM 2

1. (a) 44.814 (b) 4017.95

2. (a) 3500 (b) 621.290

3. (a) 3.5 (b) $18.90

4. $315.00

SOLUTIONS

MODULE 4 - EXAMS

SECTIONS A AND B - EXAM 1

1. (a) 35% (b) 21.8% (c) 4.6%
   (d) 483% (e) 0.08%
2. (a) 0.06 (b) 0.4 (c) 0.005
   (d) 4.5 (e) 0.2319

SECTIONS A AND B - EXAM 2

1. (a) 55% (b) 265% (c) 82.6%
   (d) 0.7% (e) 2359%
2. (a) 0.08 (b) 0.6 (c) 0.002
   (d) 0.254 (e) 2.38

SECTIONS C AND D - EXAM 1

1. (a) 25% (b) 62.5% (c) 333.3%
   (d) 14% (e) 622.5%
2. (a) 11/50 (b) 1/25 (c) 3/8
   (d) 1/400 (e) 1 1/5

SECTIONS C AND D - EXAM 2

1. (a) 37.5% (b) 40% (c) 43.75%
   (d) 575% (e) 2.5%
2. (a) 3/20 (b) 5/16 (c) 2/25
   (d) 77/300 (e) 3 3/5

SECTION F - EXAM 1

1. (a) 72 (b) $13.20 (c) 1.2 (d) $0.50

2. (a) $109 667.20 (b) $27 416.80

SECTION F - EXAM 2

1. (a) 180 (b) $36.25 (c) 20.8 (d) $1.00

2. $213 817.50 3. $20 807.10

SECTION G - EXAM 1

1. (a) 40% (b) 36.1% (c) 12.5% (d) 0.2%

2. 72% 3. 7.5%

SECTION G - EXAM 2

1. (a) 175% (b) 65.6% (c) 15 000% (d) 260%

2. 57% 3. 3.5%

SECTION H - EXAM 1

1. (a) 18 (b) $15 000.00 (c) 1040 (d) 36

2. $625.50 3. $1071.43

SECTION H - EXAM 2

(1) (a) 25 (b) $625.00 (c) 112 (d) 1600

2. $265.00 3. $72 800.00

SECTION I - EXAM 1

1. $3720.00 2. $289.65 ; $246.06

3. $17 000.00

SOLUTIONS

MODULE 4 - EXAMS

SECTION I - EXAM 2

1. $3704.81

2. (a) $266.38 (b) $245.60

3. $19 225.00

SECTION J - EXAM 1

1. (a) $13.10 (b) $96.05

2. (a) $44.75 (b) $93.98

SECTION J - EXAM 2

1. (a) $9.78 (b) $153.22

2. $158.93

SECTION K - EXAM 1

1. (a) $4536.05 (b) She lost $368.10 (c) 8.8%

2. (a) 2.7 gallons (b) $50.63

SECTION K - EXAM 2

1. (a) $680.24 (b) $255.09

2. 35.5%

3. (a) $24.60 (b) 63.6%

SOLUTIONS

MODULE 5 - EXAMS

SECTION A - EXAM 1

1. (a) $8.40 (b) $50.00
   (c) $4680.00 (d) $7290.00
2. $154.17 ($2500 x 0.15 x 148/360)

SECTION A - EXAM 2

1. (a) $7.33 (b) $28.80
   (c) $1848.00 (d) $7437.50
2. $425.83 ($3500 x 0.20 x 219/360)

SECTION B - EXAM 1

1. $132.00 2. (a) $1200.00 (b) 21.8%

SECTION B - EXAM 2

1. $345.00 2. (a) $780.00 (b) 24%

SECTION C - EXAM 1

1. (a) $191.20 (b) $34.10
2. (a) $38.60 (b) $198.60

SECTION C - EXAM 2

1. (a) $222.26 (b) $260.41
2. (a) $280.06 (b) $160.08

APPENDIX M

Solutions to Summative Examinations

SOLUTIONS

MODULE 1 - FINAL EXAMS

FORM 1

1. $2808.65 2. 5877 3. 24 166

4. 358 5. $917.75 6. (a) $14.63

(b) two 1 cent pieces; one 10 cent piece; one 25 cent piece; one 5 dollar bill.

7. (a) 3 dozen combs ---------- $45.00

2 dozen setting lotion ---------- 31.20

3 jars hand cream ---------- 2.94

8 lipsticks ---------- 18.00

(b) $97.14

SOLUTIONS

MODULE 1 - FINAL EXAMS

FORM 2

1. $5661.41 2. 2377 3. 17 604

4. 621 5. $191.00

6. (a) $24.75 (b) $15.25 (c) one 25 cent piece; one 5 dollar bill; one 10 dollar bill.

7. (a) 5 combs ---------- $ 9.75

8 brushes ---------- 25.20

4 bottles hand lotion ---------- 10.00

10 jars cleansing cream ---------- 35.00

(b) $79.95

SOLUTIONS

MODULE 2 - FINAL EXAMS

FORM 1

1. (a) 60 (b) 43/48 (c) 14 1/6

   (d) 4 19/20 (e) 1 8/9 (f) 2 1/3

2. 5/7 3. 12 4/5 4. 133/8

5. 72 6. $100.00

7. (a) 2 3/4 (b) $69.85

FORM 2

1. (a) 98 (b) 69/100 (c) 23 1/12

   (d) 8 5/12 (e) 1 17/48 (f) 6 3/4

2. 3/5 3. 18 1/4 4. 86/7

5. 60 6. $24.70

7. (a) 3 11/12 (b) $98.75

SOLUTIONS

MODULE 3 - FINAL EXAMS

FORM 1

1. 1/40 2. 0.929 3. 282.633 4. 285.84

5. 128.826 6. 89 7. (a) $60.00 (b) $301.60

FORM 2

1. 1/8 2. 0.852 3. 383.506 4. 29.75

5. 91.698 6. 63 7. (a) 550 (b) $1567.50

SOLUTIONS

MODULE 4 - FINAL EXAMS

FORM 1

1. 12.5%	2. 0.07	3. 66.7%	4. 4/25
5. $30.00	6. $7863.75	7. 8.3%	8. 360
9. $944.44	10. $7740.00		
11. (a) $21.69	(b) $122.91		

FORM 2

1. 264%	2. 0.006	3. 37.5%	4. 3/5
5. $9.00	6. $125 426.00	7. 38.5%	8. 35%
9. 60	10. $6375.00		
11. (a) $646.43	(b) $266.18		

SOLUTIONS

MODULE 5 - FINAL EXAMS

FORM 1

1. (a) $4.20 (b) $1728.00

2. $1200 x 0.18 x 234/360 = $140.40

3. (a) $600.00 (b) 14.3%

4. (a) $35.00 (b) $215.00

FORM 2

1. (a) $9.60 (b) $1350.00

2. $5600 x 0.24 x 97/360 = $362.13

3. $212.50

4. (a) $178.93 (b) $38.49

SOLUTIONS

MODULE 6 - FINAL EXAMS

FORM 1

1.

Date	Explanation	DR	CR
October 1	Balance	$650.00	$
1	Services	60.25	
1	Cosmetics Sales	32.80	
1	H.R. Supply Company		131.80
5	Services	225.15	
8	Services	264.80	
8	Cosmetics Sales	37.10	
8	Telephone		29.85
12	Services	312.35	
12	Cosmetics Sales	18.20	
12	Rent		620.00
		$1600.65	$781.65
	Balance	819.00	819.00
			$1600.65

SOLUTIONS

MODULE 6 - FINAL EXAMS

FORM 1

2. Bank Statement Balance $4601.96

Cheques outstanding:

# 215	$ 26.95	
# 219	217.09	
# 230	185.00	
# 231	189.53	618.57
		$3983.39

Deposits outstanding:

$295.80	
671.27	967.07
Adjusted Balance	$4950.46

SOLUTIONS

MODULE 6 - FINAL EXAMS

FORM 2

1.

Date	Explanation	DR	CR
June 1	Balance	$2475.78	$
4	Services	701.25	
4	Cosmetics Sales	64.40	
6	Plumbing		89.15
6	Supplies		182.50
10	Services	986.35	
10	Supplies		39.22
10	Roof Repairs		155.00
12	Services	1382.40	
12	Cosmetics Sales	59.25	
12	Taxes		218.20
		$5669.43	$ 684.07
	Balance	4985.36	4985.36
			$5669.43

SOLUTIONS

MODULE 6 - FINAL EXAMS

FORM 2

2. Bank Statement Balance $215.28

Cheques outstanding:

# 301	$ 18.27	
# 304	59.15	
# 306	112.45	
# 312	9.58	199.45
		$ 15.83

Deposits outstanding:

$198.24	
458.60	656.84
Adjusted Balance	$672.67

SOLUTIONS

MODULE 7 - FINAL EXAMS

FORM 1

1. (a) The policy is the written contract or agreement.

(b) The premium is the payment made by the insured party for protection against loss and/or damage.

(c) Life insurance is a form of insurance that pays the stated amount of money (face value) in case of accident, sickness or death. There are four main types: straight life, term, limited payment life, and endowment.

2. $281.25

3. $533.00

SOLUTIONS

MODULE 7 - FINAL EXAMS

FORM 2

1. (a) The policy holder is the party insured.

(b) The face value of the policy is the amount of money to be paid in case of loss or damage.

(c) Automobile insurance is made up of three main types: public liability and property damage - personal injury and damage to other's property; collision - damage to one's own car; comprehension - glass breakage, fire and vandalism.

2. $356.00 + $237.60 = $593.60

APPENDIX N

Solutions to Exercises

SOLUTIONS

MODULE 1

SECTION A - Exercise 1

1. 29 2. 60 3. 279 4. 2739

5. $3809.99 6. 2 813 460 7. 8 021 568

SECTION A - Exercise 2

1. $752.80 2. $133.75 3. $152.00

4. $119.80 5. $793.00

SECTION B

1. 9 2. 49 3. 244 4. 2673

5. 2899 6. 5 709 7. 2 227 458

8. 323 165

SECTION C

1. (a) $31.50 (b) 50¢ (two quarters) to make $32.00; then one 1 dollar bill to make $33.00; then one 2 dollar bill to make $35.00; then one 5 dollar bill to make $40.00; then one 10 dollar bill to make $50.00 (c) $18.50

2. (a) $178.12 (b) $86.25

   (c) one 25¢ piece; one 1 dollar bill; one 5 dollar bill; four 20 dollar bills.

3. (a) $71.00 (b) $29.00

   (c) two 2 dollar bills; one 5 dollar bill; one 20 dollar bill.

SOLUTIONS

MODULE 1

SECTION C (Continued)

4. (a) $25.30 (b) two 10 cent pieces; two 25 cent pieces; two 2 dollar bills; one 10 dollar bill.

SECTION D - Exercise 1

1. 2600 2. 6125 3. 16 298

4. 32 624 594 5. 522 324 6. 559 581 452

7. 3 273 084 8. 1 044 791 9. 30 485 082 308

SECTION D - Exercise 2

1. $106.74 2. $34.00 3. $581.00

4. (a) $24.75 (b) $5.25 5. $77.88

SECTION E - Exercise 1

1. 1033 2. 1099 3. 257

4. 15 407 R 6 5. 952 6. 295

7. 454 R 25 8. 2297 R 156 9. 3201 R 11

10. 1489 R 2054

SECTION E - Exercise 2

1. (a) 7 jars cleansing cream at $42.00 per dozen -------- $24.50

9 lipsticks at $24.00 per dozen ---------- 18.00

8 bottles hand lotion at $30.00 per dozen --------- 20.00

10 hair brushes at $43.20 per dozen ---------- 36.00

SOLUTIONS

MODULE 1

SECTION E (Continued)

(b) $98.50

2. $71.47

3. (a) $52.94 (b) $0.26375

(c) $4.50 (d) $4.25

4. (a) $4.00 (b) $22.00

5. $5327.06

SOLUTIONS

MODULE 2

SECTION A - Exercise 1

1. 25	2. 32	3. 35	4. 15
5. 42	6. 55	7. 72	8. 60
9. 132	10. 600	11. 30	12. 560

SECTION A - Exercise 2

1. 5/6	2. 5/6	3. 7/8	4. 5/7
5. 1/2	6. 1/13	7. 3/7	8. 23/32
9. 9/10	10. 1/4	11. 10/31	12. 1/7

SECTION B

1. 6 1/2	2. 15	3. 4 1/3	4. 8 1/2
5. 1 3/16	6. 7 9/11	7. 93 2/3	8. 7 3/11
9. 5 5/6	10. 92 3/10	11. 18 2/3	12. 12

SECTION C

1. 67/7	2. 68/11	3. 287/8	4. 101/3
5. 213/8	6. 977/5	7. 97/6	8. 123/10
9. 389/9	10. 1508/7	11. 273/4	12. 1727/20

SECTION D

1. 36	2. 30	3. 540	4. 72
5. 480	6. 102	7. 144	8. 72
9. 96	10. 120	11. 144	12. 280

SOLUTIONS

MODULE 2

SECTION E

1. 31/36	2. 37/48	3. 107/240	4. 31/45
5. 1 9/16	6. 1 113/144	7. 1 1/3	8. 103/126
9. 1 4/27	10. 1 23/24	11. 1 23/30	12. 3 7/120

SECTION F

1. 14 5/6	2. 5 31/45	3. 12 5/12	4. 11 2/15
5. 34 23/24	6. 19 13/24	7. 22 9/16	8. 90 7/12
9. 68 23/24	10. 57	11. 43 9/16	12. 91 49/60

SECTION G

1. 1/16	2. 1/6	3. 1/12	4. 5/11
5. 4/45	6. 1/5	7. 4 7/12	8. 4 11/20
9. 6 11/16	10. 1 17/37	11. 8 3/4	12. 1 1/48

SECTION H

1. 4/15	2. 5/9	3. 3 3/8	4. 3 1/2
5. 3 3/5	6. 1 3/20	7. 11/84	8. 280
9. 20	10. 31 1/2	11. 577 1/2	12. 1/45

SECTION I - Exercise 1

1. 9/10	2. 2/3	3. 4	4. 10
5. 5/24	6. 1 1/2	7. 3	8. 2/7
9. 1 2/3	10. 5 1/4	11. 1/9	12. 1 1/5

SOLUTIONS

MODULE 2

SECTION I - Exercise 2

1. 16 2. $33.25 3. $60.00

4. $13.75 5. $10.20

6. 3/4 dozen bottles setting lotion ---------- $11.25
   1 1/2 dozen jars cream ---------- 40.50
   1/3 dozen cans spray lacquer ---------- 10.00
   $61.75

7. $196.00 8. (a) $168.00 (b) $112.00

9. (a) 1 11/12 (b) $49.10

SOLUTIONS

MODULE 3

SECTION A

(1) 8/10 (2) 2/100 (3) 613/1000 (4) 60/1000

(5) 1293/10000 (6) 4685/10000 (7) 98623/100000

(8) 5400/10000 (9) 1865/100

SECTION B

(1) .5	(2) .375	(3) .167	(4) .818
(5) .063	(6) .656	(7) .75	(8) .833
(9) .222	(10) .947	(11) .8	(12) .333

SECTION C

(1) 1/2	(2) 2/25	(3) 17/20	(4) 1/4
(5) 4/25	(6) 1/200	(7) 19/500	(8) 9/40
(9) 1/8	(10) 4/15	(11) 101/400	(12) 5/6

SECTION D

(1) 35.20	(2) 147.25	(3) 31.12	(4) 69.11
(5) 270.14	(6) 74.595	(7) 90.086	(8) 28.303
(9) 26.231	(10) 161.715		

SECTION E

(1) 28.07	(2) 5.481	(3) .34	(4) 179.57
(5) 487.76	(6) 79.990	(7) 215	(8) 5.9992
(9) 382.2602	(10) 78.099		

SOLUTIONS

MODULE 3

SECTION F

(1) 9.576 (2) 17.272 (3) 82.94 (4) 243.78

(5) 483.392 (6) 2.528 (7) 1.75905 (8) .314 836

(9) .408 716 (10) 52.497

SECTION G - Exercise 1

(1) .351 (2) 28 (3) 3500 (4) 2.617

(5) 474.444 (6) .215 (7) 2.999 (8) 3.815

(9) 621.290 (10) 1109.001

SECTION G - Exercise 2

(1) (a) 600 (1) (b) $1440.00 (2) $126.00

(3) (a) 2 2/3 (3) (b) $9.90

(4) (a) $297.70 (4) (b) Yes, she saved $177.30

(5) (a) 8 ounces (5) (b) 12.5 gallons (5) (c) $234.38

(6) (a) $51.75 (6) (b) $238.55

SOLUTIONS

MODULE 4

SECTION A

(1) 25%	(2) 18.5%	(3) 4%	(4) 1.5%
(5) 230%	(6) 506%	(7) 181%	(8) 200.9%
(9) 608.25%	(10) 300%	(11) 0.6%	(12) 28 500%

SECTION B

(1) 0.04	(2) 0.005	(3) 0.2	(4) 0.05
(5) 0.75	(6) 0.0001	(7) 0.025	(8) 0.00375
(9) 0.00 008	(10) 0.185	(11) 3.5	(12) 1

SECTION C

(1) 75%	(2) 24%	(3) 87.5%	(4) 80%
(5) 18.75%	(6) 16.7%	(7) 66.7%	(8) 240%
(9) 57.1%	(10) 266.7%	(11) 7.5%	(12) 330%

SECTION D

(1) 9/50	(2) 3/50	(3) 1/4	(4) 7/100
(5) 7/200	(6) 1/200	(7) 1 3/4	(8) 33/200
(9) 2 2/5	(10) 11/150	(11) 1 51/200	(12) 1/32

SECTION F - Exercise 1

(1) 40	(2) 2.8	(3) $7.00	(4) $40.80
(5) 0.176	(6) $18.00	(7) $2.50	(8) $1677.00
(9) $102.19	(10) $72.50	(11) $3.41	(12) $195.36

SOLUTIONS

MODULE 4

SECTION F - Exercise 2

(1) $72 562.50 (2) $480.00 (3) $25 307.10

(4) (a) $54 833.60 (b) $13 708.40 (5) $1656.90

SECTION G - Exercise 1

(1) 40% (2) 175% (3) 12.5% (4) 260%

(5) 36.1% (6) 400% (7) 0.67% (8) 0.25%

(9) 62% (10) 32%

SECTION G - Exercise 2

(1) 48% (2) 38%

(3) 4.999% = 5.0% (4) 15.4%

SECTION H - Exercise 1

(1) 36 (2) 820 (3) 25 (4) $625.00

(5) $16 153.85 (6) 4800 (7) $5000.00

(8) 28 (9) 210 (10) $3413.33

SECTION H - Exercise 2

(1) $240.00 (2) $1012.50 (3) $2142.86

(4) $36 400.00 (5) $7875.00

SOLUTIONS

MODULE 4

SECTION I

(1) $2415.00 (2) $273.86 (3) $236.33

(4) $290.65; $245.59 (5) $8500.00

SECTION J

(1) $63.36 (2) (a) $37.75 (b) $112.95

(3) (a) $25.65 (b) $295.00

(4) $606.80 (5) $242.76

(6) $2475.00 (7) $766.40

SECTION K

(1) (a) $247.59 (b) $70.74

(2) (a) $2542.95 (b) She lost $375.00 (c) 17.3%

(3) (a) $21,200.00 (b) Gain - $6200.00 (c) 20.7%

(4) (a) $1582.00 (b) $1043.59 (c) 47.2%

(5) (a) 4 gallons (b) $75.00

(6) (a) $24.60 (b) 45.3%

(7) 36.0%

(8) (a) $5566.50 (b) $426.71

SOLUTIONS

MODULE 5

SECTION A - Exercise 1

1. $4.20 2. $2.00 3. $84.00 4. $2080.00

5. $12.50 6. $5166.00 7. $70.40 8. $543.75

9. $264.69 10. $3584.38

SECTION A - Exercise 2

1. $1325.00 2. (a) $350.00 (b) $2150.00

3. $2311.25 4. $33.00

SECTION B

1. $55.00 2. (a) $30.00 (b) 20%

3. (a) $260.00 (b) $2110.00

4. (a) $620.00 (b) 24.8%

5. $255.00

SECTION C

1. (a) $166.22 (b) $64.06

2. (a) $25.20 (b) $195.20

3. $214.40 4. $350.40

5. (a) $5578.85 (b) $1859.52 (c) $464.90

SOLUTIONS

MODULE 6

SECTION A

1.

Date	Explanation	DR	CR
April 1	Balance	$300.00	$
1	Services	30.25	
1	Mdse. Sales	16.40	
1	Ace Supply Co.		65.90
2	Services	110.80	
4	Services	183.25	
4	Mdse. Sales	18.60	
4	Telephone		22.38
5	Services	155.10	
5	Mdse. Sales	12.50	
5	Rent		420.00
		$826.90	$508.28
	Balance	318.62	318.62
			$826.90

SOLUTIONS

MODULE 6

SECTION A

2.

Date	Explanation	DR	CR
		$	$
Previous Year	Balance	1521.68	
	Services	10303.80	
	Mdse. Sales	1662.00	
	Mdse. Supplies		3567.44
	Rent		1880.00
	Electricity		351.24
	Telephone		196.80
	Laundry		184.24
	Taxes, license fees		122.84
	Misc. Expenses		165.18
		$13 487.48	$6467.74
	Balance	7 019.74	7019.74
			$13 487.48

SOLUTIONS

MODULE 6

SECTION A

3.

Date	Explanation	DR	CR
Previous Week	Balance (cash)	$ 606.69	$
	Services	2525.25	
	Cosmetics Sales	240.15	
	Postage		7.50
	Cleaning Floors		30.00
	Laundry		52.44
	Supplies		534.00
	Salaries		890.67
		$3372.09	$1514.61
	Balance	1857.48	1857.48
			3372.09

SOLUTIONS

MODULE 6

SECTION A

4.

Date	Explanation	DR	CR
May 1	Balance	$1235.68	$
6	Services	701.25	
6	Cosmetics Sales	32.40	
7	Plumbing		44.75
7	Supplies		90.00
8	Services	582.60	
8	Supplies		45.75
8	Magazines		18.00
11	Services	693.40	
11	Cosmetics Sales	29.15	
11	Laundry		38.14
11	Taxes		118.40
11	Salaries		695.14
		$3274.48	$1050.18
	Balance	2224.30	2224.30
			$3274.48

SOLUTIONS

MODULE 6

SECTION B

1. Bank Statement Balance $2043.68

Cheques outstanding:

# 68	$ 14.50	
# 92	115.20	
# 93	220.00	
#95	69.73	419.43
	Adjusted Balance	$1624.25

2. Bank Statement Balance $3601.54

Cheques outstanding:

# 103	$ 16.85	
# 112	147.08	
# 113	285.00	
# 116	89.69	
# 120	407.87	946.49
		$2655.05

Deposits outstanding:

	$155.65	
	461.92	617.57
	Adjusted Balance	$3272.62

SOLUTIONS

MODULE 6

SECTION B

5. Bank Statement Balance $895.10

Cheques outstanding:

# 132	$162.30	
# 133	255.01	
# 135	6.15	423.46
		$471.64

Deposits outstanding:

	$460.33	
	254.86	715.19
	Adjusted Balance	$1186.83

SOLUTIONS

MODULE 6

SECTION B

4. Cheque Stub Balance $322.84

Cheques written:

# 76	$37.50	
# 77	9.64	
# 78	24.68	
# 79	11.70	
# 80	42.80	126.32
		$196.52

Deposits made:

$70.00	70.00
Adjusted Balance	$266.52

Now: Bank Statement Balance $291.20

Adjusted Balance 266.52

$ 24.68

Therefore, cheque # 78 has not been cashed.

SOLUTIONS

MODULE 7

SECTION A

1. (a) Insurance is a written agreement by an insurance company to pay for losses or damages according to the conditions stated in the agreement.

(b) The policy is the written contract or agreement.

(c) The face value of the policy is the amount of money to be paid in case of loss or damage.

(d) The policy holder is the party insured.

(e) The term of the polidy is the length of time the policy is in force.

(f) The premium is the payment made by the insured party for protection against loss and/or damage.

2. Insurance companies invest the premiums paid by their customers. In this way the company accumulates surplus money with which to pay claims.

SECTION B

1. Have your instructor read your paragraphs on each type of insurance.

SECTION C

1. $202.32
2. $720.00
3. $315.00
4. $94.08
5. $291.00 + $125.00 = $416.00