

A RELATIONSHIP BETWEEN CHEATING AND ACCOUNTABILITY  
IN COMMUNITY COLLEGE MATHEMATICS CLASSES

by  
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## ABSTRACT

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David H. Strong, Doctor of Philosophy, 1975

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The purpose of this study was to investigate the relationship between cheating behavior and the situation of varying degrees of accountability in community college mathematics classes. Three community college mathematics classes were selected for the experiment with one arbitrarily designated as the High accountability group, another arbitrarily designated as the Moderate accountability group, and a third as the Low accountability group.

Five examinations were given to each class at spaced intervals during the experimental period with directions that there were penalties to one's score for guessing and that all work had to be shown on separate paper. Each class was told that every student would correct his own examination. After each examination, the instructor surreptitiously made a record of answers given by each student. When the examinations were returned for correction in class, the following took place. An answer key was passed out,

and the instructor left the room to administer the examination to those absent from the previous class. He remained absent long enough for cheating behavior to take place. Upon the instructor's return, answer sheets only were collected and placed on a table so the instructor could see which students answered which questions correctly.

For each question, a student in the High Accountability group was selected by the instructor to explain and otherwise defend his correct answer to the class' satisfaction. The selection of the student was random and based only on whether or not he had correctly answered the question. If he failed to satisfactorily defend his answer, he was either reprimanded or reminded of the directions printed on the examination. This procedure was continued for the remainder of the class until all questions were satisfactorily answered. It was usually the case that all students were called on at least once during the period. In this way, students were made to feel accountable for their answers. In the Moderate Accountability group, students were selected to answer every other question, and in the Low Accountability group, the instructor answered all questions unless a class member volunteered. When the class was finished, answer sheets were compared in the office to the earlier copies of the original answer sheets. A record was made of how many people had cheated in each class and the total number of answers that had been altered in any way.

Scores used for achievement measurement were taken from the original answer sheets.

Cheating was defined to be the deliberate changing or addition of an answer when marking one's own paper. Incidences of cheating meant the total number of answers changed, and rate of cheating meant the total number of changed answers divided by the total number of cheaters in each class.

Four hypotheses were tested: the Analysis of Variance technique was used for hypothesis A, and the chi-square statistic for hypotheses B, C, and D. These hypotheses are as follows:

(A) There are no significant differences among the achievement of the subjects in the classes with varying degrees of accountability.

(B) There are no significant differences among the number of subjects exhibiting cheating behavior in classes with varying degrees of accountability.

(C) There are no significant differences among the number of cheating incidences in classes with varying degrees of accountability.

(D) There are no significant differences among the rate of cheating in classes with varying degrees of accountability.

Using the .05 level of significance, the results are as follows:

(1) No significant differences appeared when the achievement of the classes was compared.

(2) No significant differences appeared between the number of cheaters in the classes for the first exam, but there were significantly fewer cheaters in the High Accountability group than in both the Moderate Accountability group and the Low Accountability group on the other four examinations.

(3) No significant differences appeared between the incidence of cheating in the classes for the first examination but there were significantly fewer incidences of cheating in the High Accountability group than in both the Moderate Accountability group and the Low Accountability group on the other four examinations

(4) No significant differences appeared for any exam when the rate of cheating was compared.



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## CHAPTER I

### THE PROBLEM

Cheating has been a significant concern of educators and behavioral scientists for many years. The recent discovery of a "cribbing shirt" worn during the Ch'ing Dynasty in China demonstrates the antiquity of the problem. Recent scandals involving academic cheating at the Naval Academy in 1974 illustrate the fact that the problem is still with us.

There are two theories of character on honesty and cheating in the literature. Some theorists like Hartshorne, May, and Shuttlesworth (1928) argue that honesty is situation-specific, i.e., that the situation in which a person finds himself will determine as much as anything else the honesty he displays at the time. Others, like Floyd Allport (1933) argue that honesty is a general trait of character.

Much research has been done in an attempt to discover what, if any, personality traits distinguish cheaters from non-cheaters. Major studies in this area have been reported by Bowers (1964) and Wrightsman (1959). In his review of twenty-five years of previous research in the field of cheating, Wrightsman (1959) concluded that "although cheaters do differ from non-cheaters in certain personal traits and

characteristics, such differences are not universal enough to enable us to make a confident prediction of a person's tendency to cheat on the basis of his personality."

Many studies have been done in an attempt to measure the amount of cheating in given situations. The incidence of cheating reported varies from 37 percent of the subjects measured by Goldsen (1960) to 100 percent reported by Zastrow (1970).

Attempts have also been made to discover what motivates a person to cheat. The majority of those subjects admitting cheating behavior blamed poor examinations, inadequate instruction, parental or societal pressure for grades, and various other outside influences.

It appears that the incidence, cause, and prevention of cheating has been a major concern for social scientists and educators alike. The magnitude of the problem has caused several researchers to attempt new approaches for combatting academic cheating. One idea of current educational interest is that of accountability. This notion, that students, teachers, or school systems may be held accountable for their actions, has currently received quite a bit of attention. Examples of studies in this area can be found in the writings of Henson (1974), Hottleman (1974), and Danforth (1973). It is possible that if a student is held accountable for his actions during and after a test he is more likely to do his own work and not cheat.



### Purpose of the Study

The purpose of this study is to investigate the relationship between cheating behavior and the situation of varying degrees of accountability created in the classroom by the instructor. Specifically, there might be a relationship between the amount of accountability created by the instructor in the classroom and:

1. The achievement, as measured by a series of examinations, in a class;
2. The number of cheaters in a class;
3. The number of occurrences of cheating in a class;
4. The rate of cheating in a class.

### Limitations of the Study

There were limitations in certain aspects of this study which need clarification. The sample used in the study was not randomly selected, but was assigned to the instructor with intact class units by the college. It is therefore possible that the potential cheaters were not evenly distributed in the three assigned classes.

The sample used in this study was deliberately chosen to be Business Math classes because earlier research indicated that students choosing a vocational curriculum

are more likely to cheat. It might be that different course selections would produce different results.

The categories chosen and the definitions selected for the classes in the experiment were arbitrary in nature and are therefore open to some question and interpretation. Others may choose a somewhat different intervention procedure and arrive at different conclusions.

The results obtained in this study pertain only to one particular kind of cheating; that is, changing answers on test papers that students are given to correct themselves. It is entirely possible that these results are not generalizable to all forms of cheating in the classroom.

Since only three classes were used, each containing no more than thirty-five students, it may be that a larger number of classes and/or more students in each class would produce different results.

### Overview of the Chapters

The remainder of this dissertation is organized as follows: Chapter II contains a review of the literature of cheating. This review is divided into seven subsections, each dealing with one aspect of the problem of cheating. Chapter III describes the design of the study, the hypotheses tested, the sample used, and the statistical

procedures employed. Chapter IV contains data and the results of the statistical procedures as applied to each of the four hypotheses, while the final chapter contains the conclusions and implications of the study.



## CHAPTER II

### REVIEW OF THE LITERATURE

The review of the literature was confined to those articles that dealt with college age students and adults as subjects since this was the population used in this study. However, because of its historical significance and importance, one study dealing with public school age children was included. This study was conducted by Hartshorne, Shuttleworth, and May (1928).

The main purpose of this study was the investigation of the control of occurrence of cheating and the measurement of achievement of cheaters versus non-cheaters. However, it was felt that a thorough and comprehensive review of the literature should include other relevant areas of research such as reasons why people cheat, attitudes toward cheating, and the characteristics of cheaters as opposed to non-cheaters. This has been done in Chapter II.

#### Historical Antecedents

Many attempts have been made through the years in

an attempt to determine if a person was telling the truth or not. The Bedouins of Arabia once required conflicting witnesses to lick a hot iron; the one whose tongue was burned was considered to be lying. The ancient Chinese, it is said, made someone who was questioned chew rice powder and spit it out; if the powder was dry, the suspect was considered guilty. In ancient Britain a suspect who could not swallow a "trial slice" of bread and cheese was also found guilty. All these tests were based on the early observation of a physiological change that often accompanies emotional tension: the flow of saliva decreases and the mouth becomes dry (Burke, 1967).

The first attempt to utilize a scientific instrument in an effort to detect deception occurred about 1895. In that year Cesare Lombroso published an account of several experiments he had conducted on actual criminal suspects whose truthfulness or deception he sought to determine on the basis of the presence or absence of blood pressure-pulse changes when the suspects were questioned about the offense under investigation (Reid and Inbau, 1966).

Today, physiological changes are sometimes taken as a sign that the person in whom the changes occur is not "telling the truth." The changes are measured--rather more accurately than by a hot iron, rice powder, or bread

and cheese--by the device called the polygraph. Such devices are used in law enforcement and private investigation by government and industry for checking the reliability of employees. The use of such procedures and instruments, however, is considered to be out of the question in education.

#### Literature on Frequency of Cheating

One of the earliest surveys of cheating in college was published in 1924 by Marvin. In a questionnaire given at the University of Wisconsin, 74 percent of his respondents answered yes to the question, "have you ever cheated on an exam." Bathurst (1929) found that 50 percent of his interviewees admitted cheating at least once in their academic careers. Interestingly enough, three years after Marvin and two years before Bathurst, Hillbrand (1927) polled the deans of twenty-five north central colleges concerning the problem of cheating. He found a gradual decline from 1923 through 1927 in the number of reported cases of cheating. Many colleges reported only having one or two cases brought to their attention a year. The results of these and subsequent studies concerning the incidence of cheating in college are contained in Table 1. These results are from both investigative studies and questionnaires soliciting information concerning cheating behavior.

TABLE 1  
RESULTS OF STUDIES SHOWING INCIDENCE OF CHEATING

Year	Author	Percentage Cheating at Least Once
1924	Marvin	74
1927	Fenton	63
1929	Bathurst	50
1933	Campbell	56
1933	Finkenbinder	50
1937	Corey	75
1946	Gross	67
1947	Bryson	67
1950	Cavanaugh	68
1958	Herricks	75
1960	Goldsen	37
1964	Bowers	50
1964	Hetherington	59
1966	Time Magazine	65
1970	Zastrow	100
1971	Sherrill	66
1972	Smith	91 (men) 97 (women)

Although not meant to be an exhaustive list of all studies having to do with measuring incidences of cheating,

the percentages reported generally range from 50 percent to 100 percent, with the average percentage reported about two-thirds or 67 percent. In other words, with the exception of the study reported by Goldsen (1960), about two-thirds of the subjects involved in the studies concerned with the incidence of cheating have cheated at least once in their academic careers.

#### Literature on Motivation for Cheating Behavior

In an attempt to eliminate cheating, many behavioral scientists have found it desirable to discover why a person cheats in the first place.

Frances Morehouse (1914) wrote: "Cheating is to be attributed to an untrained moral judgement. The cause is simply a neglect of the teaching of prejudices against unfair means of gaining one's ends--in the absence of which, of course, any means seems good." Lindgren (1967) stated that "essentially, the student who cheats is one who has become discouraged about behaving in a more constructive and acceptable way." Allport (1961) found that "An individual that cheats, although he claims not to believe in cheating, may be acting consistently with a stronger personal motivation; his consistency just happens not to correspond to the social ideal." Cowen (1965) asserted that



"Widespread cheating among students can be accounted for by the fact that it is not severely punished, and more important, by the fact that it is difficult to detect."

Walter Lippman (1974) has developed the point of view that:

. . . student cheating is merely a reflection in the conduct of our youth of the general breakdown in the moral order. Old ethical standards which held society in check and which we founded on old religious sanctions, have been lost as a result of the break-up of traditional religion.

As opposed to these opinionative articles, researchers who have actually surveyed students in an attempt to determine why they cheat, have found very different reasons expounded. Studies by Luke (1953), Strang (1937), Lodge (1941), Stroup (1961), Stillwell (1951), Trabue (1962), Marvin (1924), Smith, Ryan and Diggins (1972), and Zastrow (1970) found the following reasons given by students who cheated:

1. Poor instruction
2. Too difficult or too easy examinations
3. Uninteresting and/or irrelevant course content
4. Pressure from parents and/or society for high grades
5. Absence or presence of instructor during examinations
6. Poor morale on the part of the student
7. Method of grading by instructor

It seems clear that the majority of reasons given for cheating are external to the cheater himself. That is, except for "poor morale on the part of the student," all other reasons cite some external factor not under the control of the individual student.

#### Literature on Attitudes Toward and Justification for Cheating

If there was little agreement on the causes for cheating, there is agreement in the attitudes toward and justification for cheating found in the literature. The characteristics which the researchers generally found to be true are summarized in Table 2.

#### Literature on Detection and Prevention of cheating

The literature concerned with the detection of cheating is divided into two categories. One category contains the articles that are mainly advisory in nature, while the other is concerned with more sophisticated techniques to deal with the problem.

In an advisory article, Patrick (1931) advised to carefully watch the "eye-movements and positional changes of students when given their first quiz in the course." This, according to him, will reveal that some students have "habitual tendencies of looking at their neighbor's exam

paper." These are the students that will tend to cheat. Other such articles have been published by Cowen (1965) and Wesley (1964).

TABLE 2  
FINDINGS CONCERNING ATTITUDES TOWARD AND  
JUSTIFICATION FOR CHEATING

Author	Finding
Uhlig (1967), Corey (1937) LaPierre (1934), Freeman (1960)	Whether or not a person cheated had no relation to the attitudes he expressed toward cheating.
Wright (1974), Cavanaugh (1950), Stouffer (1949)	Students are much more lenient in their attitudes toward cheating than faculty.
Knowlton (1967), Smith, Ryan and Diggins (1972), Sherrill, et al. (1971), Johnson (1968)	Students who cheat feel that a lot more cheating is going on about them than students who do not cheat.
Mills (1958), Knowlton (1967)	Cheaters are more lenient in their attitudes toward cheat- ing than are non-cheaters.
Cavanaugh (1950), Centra (1970), Wright (1974), Mathews (1932), Frymier (1960), Anderson (1958), Lewis (1965)	Students generally agree as to what constitutes cheating be- havior and can justify it much more than can faculty.

More sophisticated methods of detection have been used by Dickenson (1945) and Bird (1927). Typical of such methods were complicated seating arrangements of the students, and statistical examination of test papers in an



attempt to detect collusion after the exam has been given.

The problem of prevention of cheating has also been divided into two categories. The first category deals with the offender and the second with the system.

In dealing with the cheater, Stillwell (1951) and Dabney (1966) argue that a student must be trusted in the classroom situation and must be made to feel that academic honesty is not only an important virtue for the student himself, but is important to the instructor also. Fisher (1960), wrote that we must be concerned with the cheater's self-image. Mann (1964) wrote that if we "train up a child in the way he should go: . . . he will not depart from it." Berkowitz (1964) asserted that "the right kind of child-rearing is necessary but not sufficient" for a child to resist temptation. Herman (1966) and Shirk (1961) argue for compassionate but firm handling of offenders by punitive codes of conduct administered by student-involved boards of discipline. Bernard Stern (1962) took the view that:

A large number of college students who are reported for cheating are sociopaths, i.e., people who manifest disregard for the usual codes and often come in conflict with them as a result of having lived in an abnormal environment. The college cheat is just plain crooked and his dishonesty appears in middle age as in youth.

Stern (1962) would combat the problem of cheating by swiftly and severely punishing the offenders.

In examining methods of dealing with cheating by

altering the system in which it occurs, several authors have advocated changing the existing system while others would abolish it in favor of an honor system.

Changing or abolishing examinations, grades, and homework are suggest by Platt (1961), Cabot (1938), MacDougall (1956), Speicher (1935), Gillentine (1937), Patrick (1931), Lodge (1951), and Piaget (1948). In his 1948 book, The Moral Judgement of the Child, Piaget states:

Cheating is a defensive reaction which our educational systems seem to have wantonly called forth in the child. Instead of taking into account the child's deeper psychological tendencies which urge him to work with others--emulation in no way being opposed to cooperation--our schools condemn the pupil to work in isolation and only make use of emulation to set one individual against another. This purely individualistic system of work, excellent no doubt if the aim of education be to give good marks and prepare the young for examinations, is nothing but a handicap to the formation of reasonable beings and good citizens. Taking the moral point of view only, one of two things is bound to happen. Either competition proves strongest, and each boy will try and curry favor with the master, regardless of his toiling neighbor who then, if he is defeated, resorts to cheating. Or else comradeship will win the day and the pupils will combine in organized cheating so as to offer a common resistance to scholastic restraint.

Piaget (1948), being a child psychologist, was writing about children, but many educators have felt that he could just as well have been writing about the cheating behavior of students at any age.

One method often cited in the literature for controlling cheating is the honor system. Campbell (1935)

found that "students are less likely to cheat if they are put on their honor than if they have the opportunity to cheat without being honor-bound." Canning (1956) showed a reduction from 81 percent to 30 percent in students cheating before and after an honors system was adopted. Bonjean (1965) cited an 81 percent incidence of cheating at a university without an honor system as compared to 58 percent at a university with an honor system.

There have also appeared through the years several articles warning against the use of an honor system. Lyman (1927) reported that several institutions have recently abandoned the honor system because of the lack of student cooperation. Wahlquist (1933) noted that more have used it and then abandoned it than are now practicing it. Hochreich and Rotter (1970) asked 4,605 introductory psychology students over the six-year period from 1964 to 1969 about cheating, and determined that "using the honor system of not having a teacher present during exams would probably result in increased cheating." In an article published in 1960, Tanz and Tanz (1960) reported the results of a poll they took of Canadian medical schools in which it was found that the honor system worked very well. They subsequently recommended that United States medical schools adopt the practice.

Since 1960, cheating scandals have occurred at



the Air Force Academy and the Naval Academy, both schools with a long history of tradition and practice in having an honor code. Also, the Washington Star-News carried an article by Iver Peterson (1974) describing incidences of cheating and sabotage in liberal arts, pre-med universities. Cases of pre-med students spitting in the test tubes of fellow students or upsetting delicate calibrations of instruments for students of subsequent classes are examples of the ways these students sought to make their work look better by comparison with their fellow students. It would seem that the question of whether or not an honor system promotes or reduces cheating is still unanswered.

#### Literature on the Characteristics of Cheaters

A great deal of research has been done trying to discover what, if any, personality traits are present in the cheater as opposed to the non-cheater. The results of the major studies are found in Table 3.

When examining Table 3, one might say that the investigators have either found nothing or they have found everything. This is probably what prompted Wrightsman (1959) to write, "Cheaters do differ from the non-cheaters in certain personal traits and characteristics but such differences are not universal enough to enable us to make

TABLE 3  
CHARACTERISTICS OF CHEATERS

Author	Finding
Parr (1936), Chambers (1926), Mills (1958), Harp and Taietz (1966)	Cheating increases with age
Beller (1949), Tuttle (1931), Miller (1927), Thelin (1928), Bathurst (1929)	Cheating decreases with age
Black (1962), Cohen (1967)	Cheating and age are unrelated
Yepsen (1927), Barocas (1968)	Cheating is positively correlated with intelligence
Campbell (1931), Tuttle (1929), Fenton (1927), Thelin (1928), Bathurst (1929), Canning (1956), Centra (1970), Parr (1936), White (1967), Bowers (1964)	Cheating is negatively correlated with intelligence
Campbell (1930), Brownell (1928), Woods (1957), Thelin (1928), Cohen (1967), Howells (1938)	Cheating is not correlated with intelligence or grade point average
Brownell (1928), Keehn (1956)	Cheating is related to extroversion
Strang (1937)	Cheating is related to introversion
Campbell (1933), White (1967), Hetherington (1964), Strang (1937)	Cheating is related to neuroticism
Zastrow (1970)	Cheating is not related to personality differences
Thelin (1928), Mathews (1932), Bowers (1964), Anderson (1957)	Cheating occurs more with men than with women

Table 3--Continued

Author	Finding
Smith (1972)	Cheating occurs more with women than with men
David (1967), Black (1962), Christensen (1948)	Cheating is not related to sex differences
Bonjean and McGee (1965), McQueen (1957), Bowers (1964), Harp and Taietz (1966)	Cheating occurs more with vocationally and socially oriented students than with arts and science majors

a confident prediction of a person's tendency to cheat on the basis of his personality.

#### Other Studies

There remain some studies which have not yet been mentioned because of either the subjects studied or the unusual treatments used.

One such study using school-aged children was a study of character conducted during the twentieth century, and was done by Hartshorne, May, and Shuttleworth (1928) at Columbia University for the Institute of Social and Religious Research. Their "Character Education Inquiry" was an attempt to study various aspects of character, attitudes, conduct, and opinion through the administration of a large number



of pencil-and-paper and situational tests. They endeavored in many of their tests to place an individual in a situation in which he would be forced to display various attitudes and kinds of behavior without realizing that a test of such attitudes or behavior was being given. This study was distinguished from virtually all previous attempts to find out about character because they observed character in action. Because this study concerned public-school aged children, their results will not be discussed in detail here. Of particular importance, however, is one of their main conclusions; that is, "the child's deception is as much a function of the particular situation in which he is placed as it is of his own inner experience and training." This conclusion, that honesty is situation-specific, as opposed to being a general character trait, remains a controversial issue today.

In a unique experiment conducted in California, Hoult and Hudson (1964) used two classes of sociology students, one taught by a sighted teacher and one taught by a blind teacher. The incidence of cheating was then measured by having the students correct their examinations after the papers had already been surreptitiously copied by the instructor before the class met to correct them. Their results showed that the students of the sighted instructor, when compared with students of the blind instructor,

cheated significantly more often (from two to three times as much).

Finally, two medically oriented experiments dealing with cheating will be mentioned. Schacter and Latané (1964) found that reducing arousal through the administration of the tranquilizer chlorpromazine increased cheating by college students when compared with a placebo control group. Dienstbier (1972) investigated the influence on cheating behavior of false information concerning the source of emotional arousal. His subjects cheated significantly more when anticipating arousal-related side effects from their pill, with 49 percent cheating in that arousal placebo condition against 27 percent cheating in the benign placebo condition.

#### Limitations of Previous Studies

What are we to conclude from the last seventy-five years of research concerning cheating? That it often exists and sometimes on a large scale is no longer an issue, if indeed it ever was. That the majority of students can justify their cheating behavior in their own minds is also probable. It also seems clear that while we may find some tendencies in cheaters that are not present in non-cheaters, and while most cheaters possess some personality characteristics that non-cheaters lack, we are far from being able



to adequately distinguish the two based on any sort of character test, much less make a predictive statement about who is likely to cheat and who is not. It also seems that the installation of an honor system is no sure answer.

What seems to be the most glaring omission in the literature is the lack of any experimentation in the control and reduction of cheating once it has been discovered to exist. There seems to be no advice or technique that is of immediate and practical use in the classroom. Studies seem to be one-dimensional, that is, concerned with only one aspect of the problem of cheating. Some investigations measure its incidence while others are concerned with its detection. This study attempts both to measure its occurrence and lower its incidence.

### Summary

The purpose of this chapter was to review the relevant studies in the area of cheating. Included in this chapter are studies citing the frequency of cheating, the motivation for cheating behavior, the attitudes toward and justification for cheating, the prevention and detection of cheaters, and studies citing the characteristics of cheaters.

Studies citing the frequency of cheating report that between 37 and 100 percent of the subjects studied

cheated at least once in their academic careers. The average percentage reported was about two-thirds or 67 percent.

Studies concerning the reasons given by students as to why they cheat generally find that the reasons cited are external to the individual doing the cheating. That is, the student is most likely to blame an external factor, such as parental pressure, rather than a personal one, such as lack of adequate preparation.

There is general agreement among researchers as to the attitudes toward and justification for cheating behavior. For example, several authors have found that students generally agree as to what constitutes cheating behavior and can justify it much more than can faculty.

Several articles appear in the literature concerning the detection and prevention of cheating. Complicated test procedures and seating arrangements have been recommended by some researchers, while others would either radically change the existing grading system or institute an honor system. Just what can and should be done to prevent and detect cheating remains unanswered.

Finally, in studies citing the characteristics of cheaters, there is general disagreement as to the personality characteristics possessed by the cheater as opposed to the non-cheaters. Not nearly enough is known to be able

to confidently predict who will or will not cheat in a given situation.

## CHAPTER III

### DESIGN OF THE STUDY

#### Definitions of Terms

This study was designed to investigate the relationship between cheating behavior and varying degrees of accountability created in the classroom by the instructor. A further purpose of this study was to determine the relationship between the achievement of classes with varying amounts of accountability as measured by a series of teacher-made examinations.

Three groups were used in this study: one was designated as the High Accountability group; another was designated as the Moderate Accountability group; and the third was designated as the Low Accountability group. Five measures of achievement were obtained for each group, and five measures of cheating and total incidences of cheating were also obtained. The intent was to compare achievement, number of cheaters, incidence of cheating and rate of cheating in terms of possible differences which may exist between the three groups.



For the purpose of this study, the following definitions were used:

### Cheating

Cheating was interpreted to mean the deliberate changing or addition of an answer on a student's answer sheet that had been passed back for him to correct in class.

### Incidence of Cheating

Incidence of cheating was interpreted to mean the total number of answers changed by a class for each exam.

### Rate of Cheating

Rate of cheating was interpreted to mean the total number of cheating incidences in a class divided by the total number of cheaters in that class for each exam.

### Achievement

Achievement was interpreted to mean the exam scores received by all subjects on five teacher-made classroom exams before any cheating had occurred in the correction of papers.

### Accountability

Accountability was interpreted to mean the

situation created by the instructor during the period in which the exams were reviewed and corrected. This situation of accountability was divided into three different treatment levels:

1. High Accountability. High Accountability was interpreted to mean that situation when the instructor calls on students to explain their examination answers to the class during the period when the exam is corrected and reviewed. Each question on an exam was explained by a student who had the correct answer after he corrected his paper. That student was selected by the instructor.

2. Moderate Accountability. Moderate Accountability was interpreted to mean that situation when every other question on an exam was explained to the class by a student who had the correct answer after he corrected his paper. That student was selected by the instructor.

3. Low Accountability. Low Accountability was interpreted to mean that situation when students were allowed to volunteer answers to the questions on an exam and were not called on by the instructor for answers or asked to explain any of the answers they gave.

#### Specific Hypotheses Tested

- A. There are no significant differences among the achievement of the subjects in the classes with varying degrees of accountability.

B. There are no significant differences among the number of subjects exhibiting cheating behavior in classes with varying degrees of accountability.

C. There are no significant differences among the number of cheating incidences in classes with varying degrees of accountability.

D. There are no significant differences among the rate of cheating in classes with varying degrees of accountability.

### The Sample

The sample was chosen in accordance with investigations by Bonjean and McGee (1965), Bowers (1964), and Harp and Taietz (1966), showing that the vocationally oriented student is most likely to cheat on exams. Based on these results, three classes of Business Mathematics students in Math. 151, were used in this study. The study was conducted at Prince George's Community College, Largo, Maryland, during the Fall semester, 1974. This class is required only for career and technical programs, and is not transferable to a four-year college as a major requirement in the business curriculum. Each class met three times a week, one section in the morning, one section at noon, and one section in the afternoon. The classes were

not randomly selected by the instructor but rather were assigned to him by the college. Each class period was fifty minutes in length, and the semester was fifteen weeks long. The classes each were filled to capacity with thirty-five students at the outset, but this number varied with each exam, depending on how many students had dropped the course or were absent at the time.

#### Materials and Methods Used

On the first day of class, after the usual introductory remarks by the instructor, the subjects were given a paper entitled "Class Content and Procedures" (see Appendix A). Along with the course content, the paper contained information about the number of exams to be given, the dates and type of exams the class could expect, the material the course and exams would cover, and most importantly, the class' participation in the correcting of the exams.

The classes were told that there would be five examinations covering a total of eleven chapters. Four exams would cover two chapters each, while a fifth would include three chapters. All exams would be of the multiple choice variety, and students were expected to show all of their work clearly on separate pieces of paper to be supplied to them. Students were also instructed not to guess



at any answers on the exam. They were to respond to only those questions in which they were fairly sure of their answers, and to place their answers on the separate answer sheet to be provided. To discourage guessing, their grade was to be determined as follows: number of questions correct minus number of questions incorrect. Blank questions were to be ignored. For example, suppose that on a 21-question test, a student answered fifteen questions correctly, three questions incorrectly, and skipped three questions. His score was then 15 minus 3, or 12, for that exam. These instructions were written at the top of each of the five exams also.

Each class was told that individuals were going to be able to correct their own exams. All exam material would be collected after each class and returned to them intact during the following class. At that time, make-up exams would be given to those absent during the previous class. The class would then be supplied with an answer key and allowed to correct their own exams. Since all of the instructor's classes were to be graded together on a curve, it was explained how it would be to their distinct disadvantage to pass along any exam answers to subsequent classes. The remaining time of this first class session was used for any questions the class wished to ask.

Beginning with the second class period, instruction was carried out in the lecture-style format. Tests were given about every three weeks throughout the fifteen-week semester. Since no measure of cheating could be obtained on a final exam, none was given.

The five exams contained twenty-eight, thirty-two, eighteen, twenty, and thirty-three questions respectively (see Appendix B). As much as possible, only questions which required some written work were included on the exams. However, because of the elementary nature of the course, some fairly obvious questions had to be included. This meant that when a subject was asked to explain his answer during the class following the exam, little or no explanation would be necessary. To compensate for this, the instructor prepared a list of related questions that the subject could reasonably be assumed to know, and these were asked of him after he gave his answer.

On exam days, each subject was given an exam, an answer sheet, and several pieces of blank paper on which the class members were instructed to show their work. The instructor carefully monitored the administration of each exam. The exams were collected after the fifty-minute class time had expired. Before the answer sheets were returned to the classes the following period, a copy was made of each paper and kept in a locked file in the instructor's office.

At the beginning of the class following each exam, the instructor asked all students who had missed the previous exam to wait outside of the classroom. The tests, answer sheets, work and answer key were then passed out to the class. The instructor then left the room to administer the exam to the absentees. The instructor made it a point to be absent from the class at least five minute administering these make-up exams. Had no one missed the exam, the instructor was prepared with other excuses for his absence.

When the instructor returned to the class, students were instructed to place their score, according to the formula, at the top of their answer paper and pass in their answer sheets only, and keep their exams, work, and answer key. The collected answer sheets were then spread out on a table in front of the room and the exam review was begun.

#### The High Accountability Group

The class that met in the afternoon was designated as the High Accountability Group. When their answer sheets were collected, during the period following the exam, they were spread on a table at the front of the room by the instructor. An answer key was placed next to these papers. The instructor then randomly chose an answer sheet which contained the correct answer to the first problem, and

called on the student whose name was on the paper to explain how he obtained the correct answer to that problem. When the explanation was finished, another paper was chosen that contained a correct answer to problem two, and that person whose name appeared on the paper was chosen to explain his answer. This process was continued until all problems were covered. Since some students were not able to adequately explain their answers to the satisfaction of the instructor, other students with correct answers were selected to do so. In this procedure, each student was called on at least once during each exam review period.

The majority of students called upon were able to adequately explain how they obtained their answers. Others, however, could not. When a student answered that he had "guessed" at his answer, the instructor reminded him that he hadn't followed directions, that he was not to guess at any answers, and warned him not to let it happen again. When a student answered that he either did not have his work or could not read it, the instructor informed him that he was not following directions, that he was told to show his work, and that he was not to let it happen again. Occasionally, a student would answer that he could not adequately explain verbally how he had done a problem. This student was told to copy his solution on the blackboard and then explain it to the class. When this happened,



the class proceeded on to other problems and returned to that solution when it was finished. These were the only type of answers encountered, other than satisfactory ones, throughout the semester. This procedure continued with this class for all five exams throughout the semester. The procedure took the entire class period for each exam review session.

#### The Moderate Accountability Group

The class that met at noon was designated as the Moderate Accountability Group. The procedure followed with this group was identical in every detail with the High Accountability Group, except that students were called on to answer every other problem rather than every problem. Students were again selected on the basis of whether or not they answered the problem correctly and all students were called on to answer a question once before any student was called on to answer a second problem. For simplicity sake, students were asked to answer the odd-numbered problems on the first exam, the even-numbered problems on the second exam, etc. The instructor asked for volunteers for questions that he did not select for class explanation. Questions neither explained by students chosen or volunteering were put on the board by the instructor. This procedure was followed with this class for all five exams throughout

the semester. As in the High Accountability Group, no time was left at the end of any exam periods.

#### The Low Accountability Group

The class that met in the morning was designated as the Low Accountability Group. In this class, no student was called on to answer or explain any answer unless he volunteered to do so. Problems for which there were no volunteers were explained by the instructor. This procedure was followed with this class for all five exams throughout the semester. As there was usually some time left over at the end of these exam review sessions, the instructor began the next lesson in the time remaining.

When the exam review period was over for all classes, answer sheets were compared with photostats taken of the answer sheets before they were returned to the students. A record was then made of how many people had changed or altered their answers to improve their scores. A record was also made of the total number of such changes made by each class. A record of achievement was also made for each class, based on the grades received by the students before their answer sheets were returned for their review and correction. However, for official purposes, students were assigned the grades that they had indicated on top of their answer sheets after they had corrected their exams. These were the grades recorded by the instructor in the

grade book and these were the grades ultimately received by the students on their report cards at the end of the semester. The names of those students who cheated during the semester have since been eliminated from the instructor's records, and their identity will be kept secret.

### Statistical Procedures

To accomplish the testing of the hypothesis relating to achievement, the analysis of variance technique was utilized. The scores of the subjects in each of the classes were compared for each exam on the variable achievement. The formula used for this comparison between groups was:

$$F = \frac{MSB}{MSE}$$

where MSB is the mean square between samples and MSE is the mean square error.

To measure the three relationships between numbers of cheaters, incidences of cheating, and rate of cheating between classes, the chi-square technique was utilized in order to compare the significance of the differences between the frequency distributions of the three groups (i.e., High Accountability group, the Moderate Accountability group, and the Low Accountability group). The formula for these comparisons was:

$$\chi^2 = \sum \frac{(f_i - F_i)^2}{F_i}$$

where  $f_i$  is the observed frequency in the class, and  $F_i$  is a corresponding theoretical or expected frequency for that class.

### Summary

Three groups were used in this study: one was designated as the High Accountability group; another was designated as the Moderate Accountability group; and the third was designated as the Low Accountability group. Five measures of achievement were obtained for each group, and five measures of cheating and total incidences of cheating were also obtained. The definitions of the three accountability groups, along with the definitions of achievement, cheating, instances of cheating and rate of cheating are included in this chapter. The hypotheses tested were that no significant differences would occur between the groups when achievement, number of cheaters, instances of cheating and rate of cheating were compared. The sample consisted of three classes of Business Mathematics classes at Prince George's Community College. The method used throughout the semester in the administration and correction of



examinations is included in this chapter. To analyze the data, analysis of variance was used to compare the achievement levels of the classes, while the chi-square statistic was used when number of cheaters, instances of cheating and rate of cheating were compared.

## CHAPTER IV

### ANALYSIS OF THE DATA

The four hypotheses listed in the study were tested using the analysis of variance technique or the chi-square statistic. Hypothesis A was tested by computing an F value using the analysis of variance method of statistical analysis. An F value which reached the .05 level of significance was considered necessary to reject Hypothesis A.

Hypotheses B, C, and D were tested using the chi-square statistic. A  $\chi^2$  value which reached the .05 level of significance was considered necessary to reject Hypotheses B, C, and D.

An overall correlation coefficient was then found using achievement scores. The scores for all groups on exam one were correlated with the scores for all groups on exam two. These scores on exam two were then correlated with those on exam three, and so on.

Since students did not select their business math class on the basis of whether or not they exhibited cheating behavior, and since the classes were assigned by

by the college to the instructor on the basis of his schedule rather than on the basis of how many cheaters they contained, there is no reason to believe that there was any bias on the selection of the subjects for this study.

### Hypothesis A

Hypothesis A: There are no significant differences among the achievement of the subjects in classes with varying degrees of accountability.

This hypothesis was tested by comparing scores obtained on the five teacher-made exams before they were passed back to the subjects for correction. Hence, these scores represent the achievement of the subjects before any observed cheating behavior took place

Tables 4 through 8 provide the means, standard deviations, and the percentage of cheaters in each class. Tables 9 through 13 provide the results of the analysis of variance of scores obtained on the achievement tests by all classes. There were no significant differences found; consequently, Hypothesis A was supported.

These are the means, standard deviations, and Percentage of students cheating for each exam.

TABLE 4

MEAN AND STANDARD DEVIATION AND PERCENTAGE  
OF STUDENTS CHEATING FOR ALL  
GROUPS FOR EXAM ONE

Group	Mean	Standard Deviation	n	Percentage Cheating
High Accountability	14.57	6.06	26	27
Mod. Accountability	14.02	6.78	26	27
Low Accountability	12.28	6.53	26	23

TABLE 5

MEAN AND STANDARD DEVIATION AND PERCENTAGE  
OF STUDENTS CHEATING FOR ALL  
GROUPS FOR EXAM TWO

Group	Mean	Standard Deviation	n	Percentage Cheating
High Accountability	14.44	7.29	25	12
Mod. Accountability	17.31	6.19	25	36
Low Accountability	14.83	6.66	25	36



TABLE 6  
MEAN AND STANDARD DEVIATION AND PERCENTAGE  
OF STUDENTS CHEATING FOR ALL  
GROUPS FOR EXAM THREE

Group	Mean	Standard Deviation	n	Percentage Cheating
High Accountability	5.60	4.51	26	12
Mod. Accountability	6.47	4.41	26	35
Low Accountability	7.12	3.95	26	50

TABLE 7  
MEAN AND STANDARD DEVIATION AND PERCENTAGE  
OF STUDENTS CHEATING FOR ALL  
GROUPS FOR EXAM FOUR

Group	Mean	Standard Deviation	n	Percentage Cheating
High Accountability	6.89	5.11	22	14
Mod. Accountability	7.78	5.58	22	41
Low Accountability	7.98	4.39	22	55

TABLE 8  
MEAN AND STANDARD DEVIATION AND PERCENTAGE  
OF STUDENTS CHEATING FOR ALL  
GROUPS FOR EXAM FIVE

Group	Mean	Standard Deviation	n	Percentage Cheating
High Accountability	20.08	6.25	22	9
Mod. Accountability	19.73	4.91	22	45
Low Accountability	21.16	4.38	22	50

TABLE 9  
ANALYSIS OF VARIANCE OF SCORES OBTAINED ON THE  
ACHIEVEMENT MEASURE OF EXAM ONE FOR CLASSES  
WITH VARYING DEGREES OF ACCOUNTABILITY

Source of Variation	Sum of Squares	df	Mean Squares	F	p
Between Groups	89.3695	2	44.6847	1.0781	ns
Within Groups	<u>3813.0778</u>	<u>75</u>	41.4464		
Total	3902.4473	77			

TABLE 10

ANALYSIS OF VARIANCE OF SCORES OBTAINED ON THE  
ACHIEVEMENT MEASURE OF EXAM TWO FOR CLASSES  
WITH VARYING DEGREES OF ACCOUNTABILITY

Source of Variation	Sum of Squares	df	Mean Squares	F	p
Between Groups	133.1243	2	66.5621	1.4865	ns
Within Groups	<u>3447.8631</u>	<u>72</u>	44.7774		
Total	3580.9875	74			

TABLE 11

ANALYSIS OF VARIANCE OF SCORES OBTAINED ON THE  
ACHIEVEMENT MEASURE OF EXAM THREE FOR CLASSES  
WITH VARYING DEGREES OF ACCOUNTABILITY

Source of Variation	Sum of Squares	df	Mean Squares	F	p
Between Groups	28.2766	2	14.1383	0.7637	ns
Within Groups	<u>1388.5951</u>	<u>75</u>	18.5146		
Total	1416.8717	77			

TABLE 12

ANALYSIS OF VARIANCE OF SCORES OBTAINED ON THE  
ACHIEVEMENT MEASURE OF EXAM FOUR FOR CLASSES  
WITH VARYING DEGREES OF ACCOUNTABILITY

Source of Variation	Sum of Squares	df	Mean Squares	F	p
Between Groups	15.0235	2	7.5117	0.2914	ns
Within Groups	<u>1701.2445</u>	<u>63</u>	25.7764		
Total	1716.2681	65			

TABLE 13

ANALYSIS OF VARIANCE OF SCORES OBTAINED ON THE  
ACHIEVEMENT MEASURE OF EXAM FIVE FOR CLASSES  
WITH VARYING DEGREES OF ACCOUNTABILITY

Source of Variation	Sum of Squares	df	Mean Squares	F	p
Between Groups	24.8757	2	12.4378	0.4685	ns
Within Groups	<u>1619.3046</u>	<u>63</u>	26.5459		
Total	1644.1804	65			



## Hypothesis B

Hypothesis B: There are no significant differences among the number of subjects exhibiting cheating behavior in classes with varying degrees of accountability. Differences in the number of cheaters and non-cheaters were tested using the chi-square statistic.

In an attempt to discover if the five exams were independent, measured as the students progressed through the course, an overall correlation coefficient was computed between the scores of each class for the five exams. The results are as follows:

for exams 1 and 2	.23
for exams 2 and 3	.31
for exams 3 and 4	.27
for exams 4 and 5	.28

Since the resulting correlation coefficients were low, it was determined that the five exams were indeed independent.

The results of the analysis comparing differences in the numbers of cheaters are shown in Tables 14 through 18. No significant differences were found for the first exam; however, significant differences were found between the High Accountability group and both the Moderate Accountability group, and the Low Accountability group for all four subsequent exams. Therefore, Hypothesis B was supported for the first exam, but was rejected for the other four exams.

TABLE 14

NUMBER OF CHEATERS AND NON-CHEATERS IN CLASSES  
WITH VARYING DEGREES OF ACCOUNTABILITY  
FOR EXAM ONE

Degree of Accountability	Cheaters	Non-Cheaters	Total
High Accountability	7	19	26
Mod. Accountability	7	19	26
Low Accountability	<u>6</u>	<u>20</u>	<u>26</u>
Total	20	58	78

NOTE:  $\chi^2 = .13$ ;  $p > .05$  ns.

TABLE 15

NUMBER OF CHEATERS AND NON-CHEATERS IN CLASSES  
WITH VARYING DEGREES OF ACCOUNTABILITY  
FOR EXAM TWO

Degree of Accountability	Cheaters	Non-Cheaters	Total
High Accountability	3	22	25
Mod. Accountability	9	16	25
Low Accountability	<u>9</u>	<u>16</u>	<u>25</u>
Total	21	54	75

NOTE:  $\chi^2 = 4.75$ ;  $p < .05$  s. (High, moderate and low)

$\chi^2 = 3.95$ ;  $p < .05$  s. (High and moderate)

$\chi^2 = 3.95$ ;  $p < .05$  s. (High and low)

$\chi^2 = 0.0$ ;  $p > .05$  ns. (Moderate and low)

TABLE 16

NUMBER OF CHEATERS AND NON-CHEATERS IN CLASSES  
WITH VARYING DEGREES OF ACCOUNTABILITY  
FOR EXAM THREE

Degree of Accountability	Cheaters	Non-Cheaters	Total
High Accountability	3	23	26
Mod. Accountability	9	17	26
Low Accountability	<u>13</u>	<u>13</u>	<u>26</u>
Total	25	53	78

NOTE:  $\chi^2 = 8.95$ ;  $p < .05$  s. (High, moderate and low)

$\chi^2 = 3.90$ ;  $p < .05$  s. (High and moderate)

$\chi^2 = 9.03$ ;  $p < .05$  s. (High and low)

$\chi^2 = 1.26$ ;  $p > .05$  ns. (Moderate and low)



TABLE 17

NUMBER OF CHEATERS AND NON-CHEATERS IN CLASSES  
WITH VARYING DEGREES OF ACCOUNTABILITY  
FOR EXAM FOUR

Degree of Accountability	Cheaters	Non-Cheaters	Total
High Accountability	3	19	22
Mod. Accountability	9	13	22
Low Accountability	<u>12</u>	<u>10</u>	<u>22</u>
Total	24	42	66

NOTE:  $\chi^2 = 8.25$ ;  $p < .05$  s. (High, moderate and low)

$\chi^2 = 4.12$ ;  $p < .05$  s. (High and moderate)

$\chi^2 = 8.19$ ;  $p < .05$  s. (High and low)

$\chi^2 = 0.82$ ;  $p > .05$  ns. (Moderate and low)

TABLE 18  
NUMBER OF CHEATERS AND NON-CHEATERS IN CLASSES  
WITH VARYING DEGREES OF ACCOUNTABILITY  
FOR EXAM FIVE

Degree of Accountability	Cheaters	Non-Cheaters	Total
High Accountability	2	20	22
Mod. Accountability	10	12	22
Low Accountability	<u>11</u>	<u>11</u>	<u>22</u>
Total	23	43	66

NOTE:  $\chi^2 = 9.74$ ;  $p < .05$  s. (High, moderate and low)

$\chi^2 = 7.33$ ;  $p < .05$  s. (High and moderate)

$\chi^2 = 8.84$ ;  $p < .05$  s. (High and low)

$\chi^2 = 0.09$ ;  $p > .05$  ns. (Moderate and low)

### Hypothesis C

Hypothesis C: There are no significant differences among the numbers of cheating instances in classes with varying degrees of accountability.

Differences in the number of cheating instances between classes for each exam were tested using the chi-square statistic.

The results of the analysis are shown in Tables 19

through 23. No significant differences were found between the number of cheating instances for classes with varying degrees of accountability on the first exam; however, significant differences were found between the High Accountability group and both the Moderate and Low Accountability groups on all four subsequent exams. Therefore, Hypothesis C is supported for the first exam, but was rejected for the other four exams.

TABLE 19

NUMBER OF CHEATING INSTANCES IN CLASSES WITH  
VARYING DEGREES OF ACCOUNTABILITY  
FOR EXAM ONE

Degree of Accountability	Cheating Instances	Non-Cheating Instances	Total
High Accountability	19	683	702
Mod. Accountability	21	681	702
Low Accountability	<u>15</u>	<u>687</u>	<u>702</u>
Total	55	2051	2106

NOTE:  $\chi^2 = 1.05$ ;  $p > .05$  ns.

TABLE 20  
NUMBER OF CHEATING INSTANCES IN CLASSES WITH  
VARYING DEGREES OF ACCOUNTABILITY  
FOR EXAM TWO

Degree of Accountability	Cheating Instances	Non-Cheating Instances	Total
High Accountability	12	788	800
Mod. Accountability	36	764	800
Low Accountability	<u>35</u>	<u>765</u>	<u>800</u>
Total	83	2317	2400

NOTE:  $\chi^2 = 13.80$ ;  $p < .05$  s. (High, moderate and low)

$\chi^2 = 12.37$ ;  $p < .05$  s. (High and moderate)

$\chi^2 = 11.60$ ;  $p < .05$  s. (High and low)

$\chi^2 = 0.01$ ;  $p > .05$  ns. (Moderate and low)



TABLE 21  
 NUMBER OF CHEATING INSTANCES IN CLASSES WITH  
 VARYING DEGREES OF ACCOUNTABILITY  
 FOR EXAM THREE

Degree of Accountability	Cheating Instances	Non-Cheating Instances	Total
High Accountability	11	457	468
Mod. Accountability	34	434	468
Low Accountability	<u>50</u>	<u>418</u>	<u>468</u>
Total	95	1309	1404

NOTE:  $\chi^2 = 26.04$ ;  $p < .05$  s. (High, moderate and low)

$\chi^2 = 26.67$ ;  $p < .05$  s. (High and moderate)

$\chi^2 = 12.35$ ;  $p < .05$  s. (High and low)

$\chi^2 = 3.35$ ;  $p > .05$  ns. (Moderate and low)

TABLE 22  
 NUMBER OF CHEATING INSTANCES IN CLASSES WITH  
 VARYING DEGREES OF ACCOUNTABILITY  
 FOR EXAM FOUR

Degree of Accountability	Cheating Instances	Non-Cheating Instances	Total
High Accountability	5	435	440
Mod. Accountability	35	405	440
Low Accountability	<u>58</u>	<u>382</u>	<u>440</u>
Total	98	1222	1320

NOTE:  $\chi^2 = 46.71$ ;  $p < .05$  s. (High, moderate and low)  
 $\chi^2 = 23.57$ ;  $p < .05$  s. (High and moderate)  
 $\chi^2 = 48.03$ ;  $p < .05$  s. (High and low)  
 $\chi^2 = 3.36$ ;  $p > .05$  s. (Moderate and low)

TABLE 23

NUMBER OF CHEATING INSTANCES IN CLASSES WITH  
VARYING DEGREES OF ACCOUNTABILITY  
FOR EXAM FIVE

Degree of Accountability	Cheating Instances	Non-Cheating Instances	Total
High Accountability	6	434	440
Mod. Accountability	29	411	440
Low Accountability	<u>42</u>	<u>398</u>	<u>440</u>
Total	77	1243	1320

NOTE:  $\chi^2 = 27.50$ ;  $p < .05$  s. (High, moderate and low)

$\chi^2 = 15.74$ ;  $p < .05$  s. (High and moderate)

$\chi^2 = 28.56$ ;  $p < .05$  s. (High and low)

$\chi^2 = 2.59$ ;  $p > .05$  ns. (Moderate and low)

#### Hypothesis D

Hypothesis D: There are no significant differences among the rate of cheating, previously defined as the number of cheating instances divided by the number of cheaters, in classes with varying amounts of accountability.

Differences in the rate of cheating between classes for each exam were tested using the chi-square statistic.

The results of the analysis are shown in Tables 24 through 28. There were no significant differences found; consequently, Hypothesis D was supported.

TABLE 24

RATE OF CHEATING IN CLASSES WITH VARYING  
DEGREES OF ACCOUNTABILITY FOR EXAM ONE

Degree of Accountability	Rate of Cheating	Rate of Non-Cheating
High Accountability	2.7	35.95
Mod. Accountability	3.0	35.84
Low Accountability	2.5	34.35

NOTE:  $\chi^2 = .03$ ;  $p > .05$  ns.



TABLE 25

RATE OF CHEATING IN CLASSES WITH VARYING  
DEGREES OF ACCOUNTABILITY FOR EXAM TWO

Degree of Accountability	Rate of Cheating	Rate of Non-Cheating
High Accountability	4.0	35.82
Mod. Accountability	4.0	47.75
Low Accountability	3.9	47.81

NOTE:  $\chi^2 = .22$ ;  $p > .05$  ns.

TABLE 26

RATE OF CHEATING FOR CLASSES WITH VARYING  
DEGREES OF ACCOUNTABILITY FOR EXAM THREE

Degree of Accountability	Rate of Cheating	Rate of Non-Cheating
High Accountability	1.7	22.89
Mod. Accountability	4.4	31.15
Low Accountability	4.8	38.20

NOTE:  $\chi^2 = .34$ ;  $p > .05$  ns.

TABLE 27

RATE OF CHEATING FOR CLASSES WITH VARYING  
DEGREES OF ACCOUNTABILITY FOR EXAM FOUR

Degree of Accountability	Rate of Cheating	Rate of Non-Cheating
High Accountability	1.7	22.89
Mod. Accountability	4.4	31.15
Low Accountability	4.8	38.20

NOTE:  $\chi^2 = .49$ ;  $p > .05$  ns.

TABLE 28

RATE OF CHEATING FOR CLASSES WITH VARYING  
DEGREES OF ACCOUNTABILITY FOR EXAM FIVE

Degree of Accountability	Rate of Cheating	Rate of Non-Cheating
High Accountability	3.0	21.70
Mod. Accountability	2.9	34.25
Low Accountability	3.8	36.18

NOTE:  $\chi^2 = .32$ ;  $p > .05$  ns.

### Summary

Four hypotheses were tested in this study using either the analysis of variance technique or the chi-square statistic.

Hypothesis A, which was the only hypothesis tested using the analysis of variance technique, compared differences in achievement between the three groups. There were no significant differences found between any of the three groups. Therefore, this hypothesis was supported.

Of the three hypotheses in this study that were tested utilizing the chi-square statistic, Hypotheses B and C were supported for the first exam but were rejected for each of the other four exams. That is, it was found that there were no significant differences in either the number of cheaters or in the number of instances of cheating between the classes for the first exam, but significant differences did occur for each of the remaining four exams between the High Accountability group and both the Moderate and Low Accountability groups.

Hypothesis D, which was designed to compare the rate of cheating between the classes, revealed no sig-

nificant differences for any of the five exams. Therefore, this hypothesis was supported.



## CHAPTER V

### CONCLUSIONS AND IMPLICATIONS

The purpose of this study was to investigate the effect upon cheating behavior and achievement of varying degrees of accountability created in the classroom by the instructor. The findings of the study were obtained from a sample drawn from Business Math classes at Prince George's Community College. The results reported in chapter IV lead to the following conclusions.

In testing Hypothesis A, achievement of subjects was measured and compared in all classes. No significant differences were found among the three groups studied. This finding lends support to the notion that the level of achievement of a class is not necessarily affected by the degree of accountability in the classroom.

In testing Hypothesis B, the number of cheaters in each class was compared. No significant differences were found between any two groups for the first exam, but significant differences were found between the High Accountability group and both the Moderate Accountability

group and the Low Accountability group on all four subsequent exams. No significant differences were found between the Moderate Accountability group and the Low Accountability group on any exam.

These findings suggest that a situation with a high degree of accountability does not lend itself to cheating behavior as readily as those situations where a moderate amount of accountability or none at all exist. It also seems that the situation described as Moderate Accountability was not strong enough to be a deterrent to cheating behavior since no significant differences were found when this group was compared to the Low Accountability group. The fact that no significant differences appeared between any of the groups on the first exam is probably due to the fact that all classes were equally apprehensive and skeptical about the class procedures in general and the test-correcting situation in particular. The method in which the exams were corrected was probably different from anything previously experienced by the majority of the subjects. Once the first exam was over and it became apparent that the class was to follow the procedures originally outlined by the instructor on the first day of class, the effect of the accountability variable seems to have taken hold.

In testing Hypothesis C, the number of instances of cheating were found and compared for each class. The results of this hypothesis parallel those of Hypothesis B. No significant differences were found between any groups on the first exam, but significant differences were found between the High Accountability group and both the Moderate Accountability group and the Low Accountability group on all four subsequent exams. No significant differences were found between the Moderate Accountability group and the Low Accountability group on any of the five exams. This suggests that not only do classes with a high degree of accountability produce fewer cheaters, but fewer total instances of cheating as well. The reasons why no significant differences appeared on the first exam but appeared on the four subsequent exams is again probably due to the fact that all classes were equally apprehensive and skeptical about the class procedures in general and the test-correcting situation in particular. After the first exam, the effect of the variable of accountability seems to have set in.

In testing Hypothesis D, the rate of cheating was found and compared for each class. This was done by taking the total instances of cheating and dividing this by the total number of cheaters in each class. No significant differences were found between any two groups on any of



the five exams. This suggests that there is a certain amount of consistency in those exhibiting cheating behavior that is unaffected by the climate of accountability created in the classroom by the instructor.

#### Implications for Further Research

Data presented in this study lend support to the hypothesis that cheating behavior is decreased in a classroom when a high degree of accountability is created by the instructor. A replication of this study utilizing measures of cheating other than self-correction of exams could prove fruitful. Assessment of cheating behavior in relation to accountability on class projects or term papers might prove useful.

Since this study used intact class units, it would be desirable to replicate this study using subjects randomly selected from a population, rather than intact classes.

It would also seem desirable to control the teacher variable by using several different instructors, each assigned to classes with differing levels of accountability. It might also prove fruitful if larger classes could be used to see if class size has anything to do with cheating behavior.



Perhaps if classes other than those containing career-oriented students were used, a different outcome might result. Replications of this study might be done at another type of institution other than a suburban community college. Perhaps the results from a university or a private college might produce different conclusions.

Since there were some students in each class who exhibited cheating behavior regardless of the level of accountability present, perhaps some method could be devised to deal with these students to eliminate their cheating behavior.

### Summary

The purpose of this study was to investigate the relationship between differing levels of accountability and both achievement and cheating behavior, with community college students. The focus was upon four separate phenomenon--achievement, number of cheaters, instances of cheating, and rate of cheating.

The sample was comprised of three classes of Business Math students assigned to the instructor by the college in the Fall 1974 semester. The classes were

arbitrarily designated by the instructor as High Accountability, Moderate Accountability, and Low Accountability groups.

Five teacher-made exams were administered, each covering a given number of chapters in the text. Each exam was of the multiple choice variety, and subjects were given an opportunity to correct their own papers, not knowing that the instructor had already made a record of their answers before handing their exams to them for correction. After the exams were subsequently passed back and corrected by the students, they were collected by the instructor. In the High Accountability group, students were chosen by the instructor, on the basis of their answer sheets, to explain or otherwise defend their correct answer. All questions on each exam were explained by a student to the class throughout the semester. When a student was unable to do so, he was reprimanded by the instructor. In the Moderate Accountability group, every other question was explained by a student to the class, and in the Low Accountability group, the instructor explained all exam questions.

Four hypotheses were formulated and tested. These were as follows:

A. There are no significant differences among the achievement of the subjects in classes with varying degrees of accountability.

B. There are no significant differences among the number of subjects exhibiting cheating behavior in classes with varying degrees of accountability.

C. There are no significant differences among the number of cheating instances in classes with varying degrees of accountability.

D. There are no significant differences among the rate of cheating in classes with varying degrees of accountability.

The results of the study indicated that a class' achievement as measured on the five teacher-made exams was not dependent on the degree of accountability introduced into the classroom by the instructor. That is, no significant differences were found between classes with High, Moderate, or no accountability climates.

After the first exam, it was found that both the number of cheaters and the total instances of cheating decreased in the classes with High Accountability as compared with the class with Moderate Accountability and

the Low Accountability group. Subjects in the High Accountability class had significantly fewer cheaters and significantly fewer total instances of cheating than did either the Moderate Accountability group or the Low Accountability group. No significant differences were found between the rate of cheating in any of the three classes studied.



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APPENDIX A

COURSE CONTENT AND PROCEDURES

This is the paper containing the course content and procedures that was passed out to all classes on the first day of school.

COURSE CONTENT AND PROCEDURES

Course: Business Mathematics--Math. 151

Text: Business Mathematics--A Collegiate Approach by  
Nelda W. Rousche

Syllabus: Chapters 1, 2, 3, 4, 5, 12, 13, 14, 15, 16, 17

This course covers the material in 11 chapters of the text. The material in these chapters will be covered through five examinations throughout the semester. These exams will occur approximately three weeks apart, with the first one taking place on or about Sept. 13. The first exam will cover chapters 1 and 2; the second exam will cover chapters 3 and 4; the third will cover 5 and 12; the fourth will cover 13, 14, and 15; and the last exam will cover chapters 16 and 17. There will be no cumulative final exam. You are responsible for not only the material covered in these chapters that is contained in the text, but also for any additional information brought up in class by the instructor that relates to the subjects contained in the text.

All exams will be of the multiple choice type. This is to be distinguished from the multiple guess type by the following restriction: You are only to answer those questions which you are fairly sure you know are correct. You are not to guess at any questions. If you do not know the answer to a particular problem or are not sure if your answer is correct, do not answer it. Blank answers will not count against you, but incorrect ones will. That is, your score will be determined by the number of correct answers minus the number of incorrect answers. For example, suppose on a 21 question exam you answer 14 correct, 4 incorrect, and leave 3 unanswered. Your score will be  $14 - 4$  or 10. Your grades will then be combined with the grades from two other Math. 151 classes and a curve will be determined. Since you are, therefore, in competition with all students taking the exam, it is to your distinct disadvantage to assist any students in later classes with solutions to problems. This will tend to "increase the curve" and put you and your classmates in a relatively poorer position in relation to the curve. You will be given a curve of the grades after each exam and they will be cumulative in nature; that is, the second curve will be based on the first two exams, the third curve on the first

three, etc. Hence, make sure that you keep a record of your grades so that you will be able to determine your grade at any point in time throughout the course.

You will be asked to mark your answers on a separate answer sheet that will be provided for each exam. You are also required to keep a clear and legible record of all work required by you to do each and every problem on each exam. During the period following each exam, your exams, work, and answer sheets will be passed back to you along with an answer key and you will then correct your own exams. You will then pass in your answer sheets and we will go over the exams in class. The answer sheets will be returned after I have recorded your grade. The grades from these five exams will determine your final grade for the semester.

I hope that you have an enjoyable semester, and that if you have any problems you will contact me either in or out of class. You have been given my office number and hours, and, if it important, you may call the mathematics secretary and ask that she reach me at home. If you leave your name and number with her, I will call you back. Since we no longer have a grade of "F" in this college, there is no need to drop the course because you feel that you are failing. The worst that you can do is to receive a grade of



"NC" which means No Credit. This grade, while not giving you any credit, does not count against you in your grade point average. My point is that there is little academic reason to drop the course. However, if a personal problem arises, please let me know before you drop the course. Also, if you are absent, call and find out what you have or will miss and pick up the assignment while you are at it.

Good luck for this course and for your entire academic career.

David Strong  
Dept. of Mathematics

APPENDIX B

EXAMINATIONS

The following are the five teacher-made exams administered to the Business Math. classes during the Fall 1974 semester.

Exam OneMath. 151Fall 1974

Directions: Read each question carefully and select the answer that best fits the problem. Answer only those questions that you are fairly sure of getting correct. DO NOT GUESS: Your score will be determined by taking the number of correct problems and subtracting the number of incorrect problems. You must put all necessary work on the paper supplied. Make sure that your work is neat and easily readable. Put your name on all papers that you pass in, and put your answers on the answer sheet provided. Do not write on the exam paper. Good Luck.

1. Add:  $1,554.45 + 236.18 + 91.060 + 1,428.2600$ .  
(A) 3,309.95      (B) 3,310.05      (C) 3,308.95  
(D) 3,310.95      (E) none of these
2. Subtract:  $15.13 - 4.9641$   
(A) 10.1741      (B) 11.1759      (C) 10.1700      (D) .101659  
(E) none of these
3. Multiply:  $179.029 \times .0156$ .  
(A) .027928524      (B) .27928524      (C) 2.7928524  
(D) 27.928524      (E) none of these
4. Divide:  $38.558$  by  $.26$ .  
(A) 14,830      (B) .01483      (C) 1483      (D) 148.3  
(E) none of these

5. A 5-gallon can of milk costs \$4.75, while a 6-gallon can costs \$5.25. How much is saved in the purchase of 60 gallons by buying the larger cans?  
(A) \$1.25 (B) \$1.75 (C) \$2.25 (D) \$4.50  
(E) \$3.75
6. Mr. Jacobs is taking his family on a vacation trip covering 3100 miles. He can go 20 miles on each gallon of gasoline. If gasoline costs 32¢ a gallon, how much will the gasoline cost for the trip?  
(A) \$47.40 (B) \$48.20 (C) \$48.80 (D) \$49.60  
(E) none of these
7. A salesman covered the following distances: 114.6 miles, 227.8 miles, 314.4 miles, and 400 miles. How much more or less than 1000 miles did he travel?  
(A) 943.2 (B) 303.2 (C) 56.8 (D) 42.6  
(E) none of these
8. How many pieces of plywood each .25-inch thick, are required to make a pile 1 1/2 feet high?  
(A) 48 (B) 64 (C) 72 (D) 84 (E) none of these
9. Combine and express to the nearest tenth:  
 $2\frac{5}{8} + 10(.47)$   
(A) 2.7 (B) 3.1 (C) 7.3 (D) 5.0 (E) 49.6
10. Combine:  $\frac{1}{2} + \frac{3}{5} - \frac{5}{6}$   
(A)  $\frac{1}{15}$  (B)  $\frac{4}{15}$  (C)  $\frac{11}{15}$  (D)  $\frac{14}{15}$  (E)  $\frac{29}{15}$
11. Multiply and divide as indicated:  $2\frac{1}{2} \times \frac{1}{6} \div 1\frac{1}{4}$   
(A)  $\frac{2}{15}$  (B)  $\frac{1}{3}$  (C)  $\frac{25}{48}$  (D)  $\frac{1}{6}$  (E)  $\frac{5}{6}$

12. Which one has the smallest value? .2; .22; .02; .202; .022?  
(A) .2 (B) .22 (C) .02 (D) .202 (E) .022
13. Arrange the following fractions in order of size beginning with the smallest.  
 $\frac{7}{24}, \frac{5}{16}, \frac{13}{48}$   
(A)  $\frac{13}{48}, \frac{5}{16}, \frac{7}{24}$  (B)  $\frac{13}{48}, \frac{7}{24}, \frac{5}{16}$  (C)  $\frac{5}{16}, \frac{13}{48}, \frac{7}{24}$   
(D)  $\frac{7}{24}, \frac{13}{48}, \frac{5}{16}$  (E)  $\frac{7}{24}, \frac{5}{16}, \frac{13}{48}$
14. Rewrite 3,756,548 rounded off to the nearest thousand.  
(A) 3,756,600 (B) 3,756,500 (C) 3,756,000  
(D) 3,756,550 (E) none of these
15. Rewrite 4366.0249 to the nearest hundredth.  
(A) 4400 (B) 4370 (C) 4366.02 (D) 4366.03  
(E) 4366.025
16. Simplify the following:  $8 - 2 \times 3 + 4 \div 2$ .  
(A) 4 (B) 11 (C) 21 (D) 20 (E) none of these
17. Solve for y:  $9y - 5(y - 2) + 14$ .  
(A) 1 (B) 2 (C)  $3 \frac{1}{2}$  (D) 4 (E) 6
18. Solve for x:  $3(1 - x) - 4(2 - x) = 10$   
(A) 15 (B) -15 (C)  $-\frac{15}{7}$  (D)  $-\frac{5}{7}$  (E) 21
19. Solve for y:  $9 - 5y = 7 - 6y$ .  
(A) 2 (B)  $-\frac{2}{11}$  (C) -2 (D)  $\frac{2}{11}$  (E) 16
20. Solve for x:  $\frac{2}{3}x - \frac{1}{3} = 1$   
(A)  $\frac{3}{2}$  (B)  $\frac{2}{3}$  (C)  $\frac{1}{2}$  (D) 3 (E) 2



21. Solve for  $n$ :  $\frac{n}{3} - \frac{n}{4} = 6$   
(A) 60      (B) 24      (C) 48      (D) 72      (E) 14
22. Solve for  $x$ :  $3x - .34 = .18 + 5x$ .  
(A)  $-.26$       (B)  $.26$       (C)  $-2.6$       (D)  $2.6$       (E)  $-.065$
23. A school is made up of 1 part seniors to 7 parts other students. If a total of 1120 students are enrolled, how many of them are not seniors?  
(A) 140      (B) 160      (C) 740      (D) 960      (E) 980
24. Three men invest money in an enterprise with the agreement that all profits are to be divided in the ratio 3:7:8. If the profits at the end of the first year are \$2700, what is the largest share?  
(A) \$450      (B) \$1050      (C) \$1200      (D) \$1500  
(E) \$1800
25. An accountant was checking an invoice for 55 blenders totaling \$600. The total number of items was correct, but the number of each of the two models was illegible. If the standard model costs \$10 and the deluxe model costs \$12, how many regular models did he receive?  
(A) 60      (B) 50      (C) 30      (D) 25      (E) none of these
26. A farmer has 150 feet of fencing which he wants to use to make a rectangular enclosure using the side of his 60 foot barn as one of the lengths of the rectangle. The rectangle is then to be divided in half with a fence parallel to the two widths. How long will the width of the rectangle be?  
(A) 10      (B) 15      (C) 45      (D) 30      (E) none of these

27. It costs a publisher \$3600 to prepare a book and make the plates for printing it. Each 1000 copies printed costs an additional \$900. If the book sells for \$4.50 a copy, what equation will tell us how to find out how many copies must be printed and sold before a profit will be made?
- (A)  $(900/1000)x + 4.50x = 3600$       (B)  $3600 + (900/1000)x = 4.50x$   
(C)  $x + 4.50x = 3600$       (D)  $3600 + (1000/900)x = 4.50$   
(E)  $(1000/900)x + 4.50x = 3600$
28. Change the following repeating decimal into a fraction:  $2.4313131\dots$
- (A)  $2 \frac{431}{1000}$       (B)  $\frac{2407}{999}$       (C)  $\frac{2407}{990}$       (D)  $\frac{2431}{1000}$   
(E) none of these

Exam TwoMath. 151Fall 1974

Directions: Read each question carefully and select the answer that best fits the problem. Answer only those questions that you are fairly sure of getting correct.  
DO NOT GUESS: Your score will be determined by taking the number of correct problems and subtracting the number of incorrect problems. You must put all necessary work on the paper supplied. Make sure that your work is neat and easily readable. Put your name on all papers that you pass in, and put your answers on the answer sheet provided. Do not write on the exam paper. Good Luck.

1. What is 102% of 60?  
(A) 6.12      (B) 61.2      (C) 612      (D) 6120      (E) 60.12
2. .8 is what percent of 3.2?  
(A) .25%      (B) 2.5%      (C) 25%      (D) 250%      (E) 25.6%
3. .56 is .7% of what number?  
(A) .392      (B) .8      (C) 8      (D) 80      (E) 800
4. In a basketball game, Murray took 18 shots and made 5. What is his scoring percentage?  
(A) 36%      (B) 32%      (C) 28%      (D) 24%  
(E) none of these
5. An old-model toaster is marked at \$22.50. If a 10% discount is given, what is the new price of the toaster?  
(A) \$20.25      (B) \$24.75      (C) \$20.00      (D) \$25.00  
(E) none of these
6. A class earned \$60 commission on the sale of magazines. This was 25% of their sales. How much did they sell?  
(A) \$15      (B) \$20      (C) \$240      (D) \$1500  
(E) none of these

7. In a quiz, there were 50 questions. John got a score of 86%. How many questions did he get right?  
(A) 42 (B) 43 (C) 44 (D) 45 (E) none of these
8. In a test having 50 questions, Diane had 40 questions right. On the next test having 50 questions, she had 10% higher score. How many questions did she have right on the second test?  
(A) 42 (B) 45 (C) 46 (D) 48 (E) none of these
9. A certain auto depreciates in value 25% yearly. If the original value was \$3200, what is the net change in value of the car over a two-year period?  
(A) -\$200 (B) -\$1400 (C) -\$1500 (D) -\$1600  
(E) -\$1800
10. If a man's salary of \$5000 is first increased by 20% and then decreased by 10%, what is the net change of salary for this man?  
(A) -\$400 (B) +\$40 (C) +\$50 (D) +\$400  
(E) +\$500
11. A 20-ounce solution of salt and water contains 4 ounces of salt. If 4 ounces of water evaporates, what is the percent of salt in the new solution?  
(A)  $16\frac{2}{3}\%$  (B) 25% (C) 20% (D) 30% (E)  $33\frac{1}{3}\%$
12. A family's annual income is \$10,000. If 34% of this is spent for food and  $27\frac{1}{2}\%$  for rent, how much is left for other purposes?  
(A) \$37.50 (B) \$375 (C) \$400 (D) \$3750  
(E) \$6250
13. Of the numbers  $\frac{3}{5}$ ,  $\frac{16}{25}$ ,  $\frac{5}{8}$ , .627, and  $62\frac{2}{3}\%$ , the largest is  
(A)  $\frac{3}{5}$  (B)  $\frac{16}{25}$  (C)  $\frac{5}{8}$  (D) .627  
(E)  $62\frac{2}{3}\%$

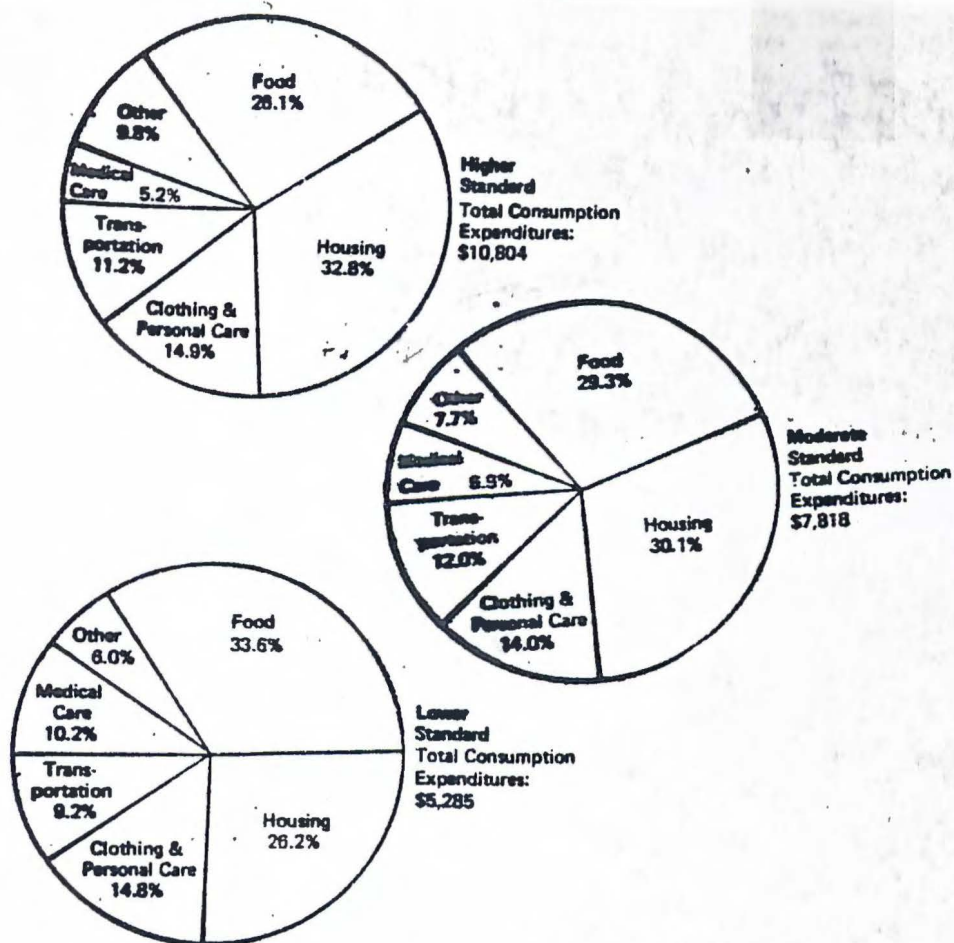


14. A salesman earns a commission of 6% on all sales between \$300 and \$500, and 10% on all sales over \$500. Of his sales of \$1440, how much did he earn?  
(A) \$39.40      (B) \$91.20      (C) \$106      (D) \$124  
(E) \$10.60
15. A man purchased a plot of land for \$5250 and built a house on it for \$19,750. What percent of the total cost was the cost of the plot?  
(A) 2.1%      (B) 21%      (C) 27%      (D) 30%      (E) 79%
16. A baseball team has lost 30 games of the first 45 played. How many of the remaining 55 games to be played must they win in order to finish the season with a winning percent of 60%?  
(A) 25      (B) 30      (C) 33      (D) 35      (E) 45
17. The median of the following group of scores is:  
30, 30, 22, 27, 12, 26, 28, 31  
(A) 30      (B) 25.75      (C) 27.5      (D) 26      (E) 28
18. The relationship between the mean and the median for grouped data is:  
(A) the mean always exceeds the median  
(B) the median always exceeds the mean  
(C) the mean and median are usually equal  
(D) the mean and median are never equal  
(E) the mean and median are not related in size

On the following pages will be several graphs. They are followed by questions that refer to the graphs directly above them.



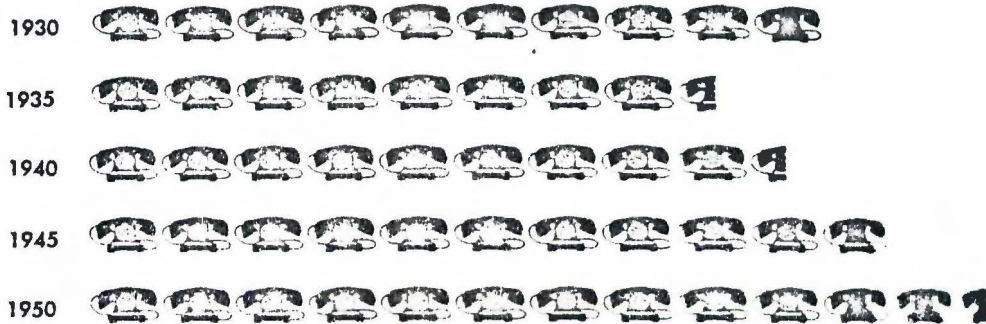
# **URBAN FAMILY LIVING STANDARDS**



19. As family income decreases, what happens to the amount spent for medical care?
  - (A) declines 15%
  - (B) increases by 10%
  - (C) stays the same
  - (D) almost doubles
  - (E) declines 30%
20. Which item in all three budgets remains approximately constant?
  - (A) food
  - (B) clothing and personal care
  - (C) housing
  - (D) medical care
  - (E) transportation
21. What is the approximate ratio spent for housing between the highest and lowest standards?
  - (A) 6:5
  - (B) 3:2
  - (C) 2:1
  - (D) 4:4
  - (E) 1:3

22. What is the highest approximate percentage that is spent for transportation in any standard?

(A) 15%      (B) 10%      (C) 14%      (D) 11%      (E) 12%



The pictograph above represents the number of telephones in use in a certain city. Each complete symbol represents 20,000 telephones.

23. How many telephones were in use in this city in 1945?

(A) 110,000      (B) 220,000      (C) 200,000  
(D) 120,000      (E) none of these

24. How many more telephones were in use in this city in 1945 than in 1935?

(A) 50,000      (B) 25,000      (C) 70,000      (D) 75,000  
(E) none of these

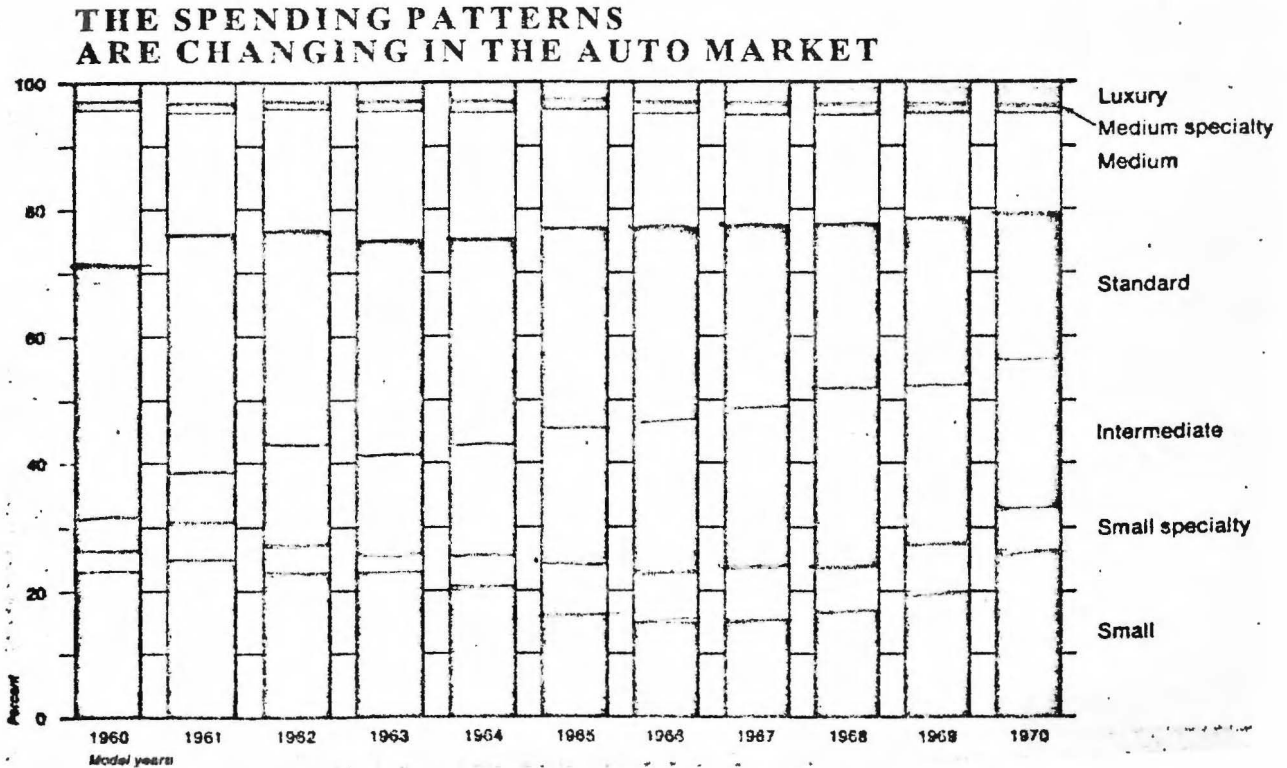
25. Find the percent of increase in the number of telephones in use in 1950 over the number in use in 1930.

(A) 50%      (B) 10%      (C) 20%      (D) 25%  
(E) none of these

26. If it is estimated that 280,000 telephones were in use in 1955, how many symbols should be used to picture this on the graph?

(A) 18      (B) 15      (C) 14      (D) 16      (E) none of these

27. During what year were there 190,000 telephones in use?  
 (A) 1930 (B) 1935 (C) 1940 (D) 1945  
 (E) none of these



28. Which group of cars has shown the least change in percentage of sales from 1960 to 1970?  
 (A) intermediate (B) small and small specialty  
 (C) standard (D) luxury and medium specialty  
 (E) medium
29. In what year did standard cars command 40% of the car market?  
 (A) 1962 (B) 1964 (C) 1961 (D) 1966  
 (E) 1960

30. Which type of car has shown the greatest increase in sales during the charted period?
- (A) small      (B) intermediate      (C) standard  
(D) medium      (E) small specialty
31. What was the greatest approximate percentage of the market held by the largest-selling type of car in 1970?
- (A) 26%      (B) 20%      (C) 22%      (D) 18%      (E) 16%
32. Which of the following may be inferred from this chart?
- (A) Luxury cars command a growing segment of the market  
(B) The standard-size car is still the choice of a majority of car buyers  
(C) Small cars have shown a dramatic resurgence in popularity  
(D) Medium-price cars are becoming increasingly popular  
(E) The intermediate car will soon be the largest-selling type



Exam ThreeMath. 151Fall 1974

Directions: Read each question carefully and select the answer that best fits the problem. Answer only those questions that you are fairly sure of getting correct.  
DO NOT GUESS: Your score will be determined by taking the number of correct problems and subtracting the number of incorrect problems. You must put all necessary work on the paper supplied. Make sure that your work is neat and easily readable. Put your name on all papers that you pass in, and put your answers on the answer sheet provided. Do not write on the exam paper. Good Luck.

1. A family lives in an area where there is a 3% sales tax. In one week, they spent \$74.32, including tax, on food. How much of this total was tax?  
(A) \$4.45      (B) \$4.46      (C) \$2.16      (D) \$5.72  
(E) \$2.23
2. A man lives in a city where there is a city sales tax of 1% and a state sales tax of 3 1/2%. During one year he spent \$2,245 on goods subject to taxes. What was the total price he paid for these goods?  
(A) \$2267.45      (B) \$2312.35      (C) \$2346.81  
(D) \$2346.03      (#) \$2148.33
3. In an area that has a city tax of 1 1/4% city sales tax and a state sales tax of 3 1/2%, a man spent \$1836 on taxable items (including tax). How much of the taxes that he pays should he send to the state?  
(A) \$64.26      (B) \$61.35      (C) \$21.91      (D) \$22.95  
(E) \$83.26
4. A man lives in an area subject to a 4% sales tax only on non-food items. In a month he spent a total of \$3346 on all items including tax. Of the total amount he spent (\$3346), 47% was spent on items subject to the tax. How much of his expenditures represented sales tax?  
(A) \$60.49      (B) \$62.91      (C) \$133.84      (D) \$151.21  
(E) \$157.26



5. The proposed budget for the coming year is \$3,245,642 and the assessed valuation of the taxable property is \$89,467,000. If the tax rate is expressed in mills, what will it be?
- (A) 3 mills      (B) 4 mills      (C) 36 mills  
(D) 37 mills      (E) 362 mills
6. In problems 5, suppose that the tax rate is expressed as dollars per 100 dollars of assessed valuation. What is the tax rate then?
- (A) 36¢ per 100      (B) \$3.62 per 100      (C) \$3.63 per 100  
(D) \$36.28 per 100      (E) \$36.27 per 100
7. Mr. Axelrod owns a home assessed at \$19,500 where the tax rate is 47 mills. What is his real estate tax?
- (A) \$91.65      (B) \$916.50      (C) \$9.16  
(D) \$19.50      (E) \$195.00
8. Mr. Kemp paid \$471 in real estate taxes on a piece of property valued at \$14,600. What is his tax rate expressed as dollars per \$100 of valuation?
- (A) \$3.22      (B) \$3.23      (C) \$32.26      (D) \$32.27  
(E) \$31.00
9. Mr. Ashenhurst paid \$743 in real estate taxes in an area where the rate is \$1.50 per thousand. What is the assessed valuation of his property?
- (A) \$49,533      (B) \$495,333      (C) \$11,145  
(D) \$111,450      (E) \$743,000
10. Mr. Johnson receives an invoice for \$275 dated July 15. The terms on the invoice are 2/10, 1/20, net 60. He mails his check on August 4. How much should he send?
- (A) \$269.50      (B) \$266.81      (C) \$272.45  
(D) \$275      (E) \$266.75

11. Mr. Porter receives an invoice dated September 9 for \$320 with terms 3/10, 30X. If he mails out his check on October 20, how much should he pay?  
(A) \$320 (B) \$310.40 (C) \$288 (D) \$224  
(E) none of these
12. Cowee Manufacturing offers trade discounts of 40/30/20 to Fisher, Inc. On an invoice of \$7,600, how much does Fisher pay?  
(A) \$760 (B) \$182.40 (C) \$3192 (D) \$2553.60  
(E) \$346.49
13. After receiving discounts of 20/10/5 for an item, its price was \$237. What was the original list price of the item?  
(A) \$328.48 (B) \$319.95 (C) \$750 (D) \$312.84  
(E) none of these
14. A \$12 item was marked down 15%. It was then discounted again so that it sold for \$4.08. What was the second discount percent?  
(A) 60% (B) 34% (C) 85% (D) 75%  
(E) none of these
15. A firm receives several invoices the same day. The terms on these invoices are (1) 2/10, 1/20, n/30; (2) 3/10 R.O.G.; (3) 3/10 E.O.M.; (4) 1/10, 2/20-10X. If he can pay at the earliest possible time, who will give him the largest discount?  
(A) 2 (B) 2 and 3 (C) 1, 2, and 3  
(D) 1, 2, 3, and 4 (E) depends on the date on the invoice

16. In example 15, suppose he gets his merchandise on September 18 and his invoice is dated September 20. Who gives him the most time to pay, without his being overdue in his payment?
- (A) 1, 2, and 3      (B) 2 and 3      (C) 4  
(D) 1, 3, and 4      (E) none of these
17. In example 15, which invoice gives him the least time in which to pay before he is overdue with his payment?
- (A) 1      (B) 2      (C) 4      (D) 1 and 3      (E) none of these
18. Getting discounts of 30/20/10/5 is the same as getting what discount?
- (A) 65%      (B) 60%      (C) 48%  
(D) depends on the cost of the item      (E) none of these

Exam Four

## Math. 151

Fall 1974

Directions: Read each question carefully and select the answer that best fits the problem. Answer only those questions that you are fairly sure of getting correct.  
DO NOT GUESS: Your score will be determined by taking the number of correct problems and subtracting the number of incorrect problems. You must put all necessary work on the paper supplied. Make sure that your work is neat and easily readable. Put your name on all papers that you pass in, and put your answers on the answer sheet provided. Do not write on the exam paper. Good Luck.

1. During a sale, a sheet was discounted from \$3.75 to \$3.00. What discount rate was the purchaser receiving?  
(A) 80%    (B) 12 1/2%    (C) 25%    (D) 20%  
(E) none of these
2. A candy store dealer purchased a box of 144 bars of candy for \$2.75. He sold it for 5¢ a bar. What is the percent markup on cost?  
(A) 62%    (B) 38%    (C) 162%    (D) 49%  
(E) none of these
3. A men's shop bought 15 dozen shirts at \$30 a dozen. He sold each shirt for \$3.95. He encountered expenses of \$25 connected with the sale. What was the percent of profit based on the selling price of the shirts?  
(A) 33%    (B) 50%    (C) 52%    (D) 67%  
(E) none of these
4. At what price should a merchant sell typewriters that he bought at \$76.20 if his markup rate is 40% based on retail?  
(A) \$106.68    (B) \$127    (C) \$121.92  
(D) \$116.20    (E) none of these



5. Candlesticks were purchased by a shop at \$7.96 less 25%. If the retail is determined by a 35% markup on cost, what is the selling price?  
(A) \$8.76      (B) \$9.18      (C) \$12.25      (D) \$10.75  
(E) none of these
6. The owner of a men's shop purchased 5 dozen ties that he sold for \$1.50 each. If his markup is based on 30% of sales, what is the total cost of the ties to the merchant?  
(A) \$63      (B) \$69.23      (C) \$117      (D) \$90  
(E) none of these
7. A dealer sold 20 radios at \$42.50 each. The markup based on selling price was 40%. Expenses connected with the sale was \$145.50. What was the net profit on this sale?  
(A) \$364.50      (B) \$194.50      (C) \$340      (D) \$510  
(E) none of these
8. A florist purchased 40 plants at \$2.00 each. About 5% will have to be thrown out. What must he charge per plant to make 30% on cost?  
(A) \$2.60      (B) \$3.01      (C) \$2.86      (D) \$2.74  
(E) none of these
9. An article had been selling for \$90 less 33  $\frac{1}{3}$ %. What additional discount rate will have to be given to reduce the price to \$54?  
(A) 9%      (B) 6%      (C) 10%      (D) 20%      (E) none of these
10. A man bought a bookcase for \$72.50 less 20. What is the list price if he wants to realize a profit of 50% based on cost?  
(A) \$87      (B) \$116      (C) \$108.75      (D) \$130.50  
(E) none of these



11. A markup of 40% of the cost was added to the cost of a bike and it was sold for \$32.20. What was the original cost?
- (A) \$19.32      (B) \$23      (C) \$12.88      (D) \$13.80  
(E) none of these
12. A man paid \$250 less 25 and 10 for an icebox. In addition he had to pay a delivery charge of \$6.25. Overhead amounts to 20% of retail and his profit is 10% of retail. What is the list price of the icebox?
- (A) \$219.38      (B) \$227.50      (C) \$211.25      (D) \$250  
(E) none of these
13. Mr. Brown deposited a sum of money in a bank at 6% annual interest. If his deposit grew to \$371 after one year, how many dollars did he originally deposit?
- (A) \$300      (B) \$325      (C) \$350      (D) \$360  
(E) none of these
14. Find the simple interest on \$3600 for 4 months at 4% annual interest.
- (A) \$4.80      (B) \$36      (C) \$48      (D) \$60  
(E) none of these
15. What is the exact interest on \$640 at 6% for 85 days?
- (A) \$9.07      (B) \$9.38      (C) \$9.51      (D) \$8.94  
(E) none of these
16. A note is dated August 17 for \$300 at 6% interest and is due December 20. What is the interest due?
- (A) \$6.16      (B) \$20      (C) \$20.28      (D) \$6.20  
(E) none of these
17. What principal will earn \$15 interest at 5% in 2 years?
- (A) \$150      (B) \$300      (C) \$1500      (D) \$375  
(E) none of these

18. What rate earns \$76.80 on \$640 in 3 years?  
(A) 12%      (B) 4%      (C)  $2\frac{1}{2}\%$       (D) 3.6%  
(E) none of these
19. How long will it take \$3500 to earn \$437.50 at 5% interest?  
(A) 2 years      (B)  $2\frac{1}{2}$  years      (C) 27 months  
(D) 33 months      (E) none of these
20. What sum will be needed today to have an amount equal to \$402.50 after  $2\frac{1}{2}$  years if money is worth 6%?  
(A) \$300      (B) \$325      (C) \$400      (D) \$350  
(E) none of these

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1. Businessmen generally dislike to borrow money because:
  - (A) It is a sign of poor management
  - (B) It might make the value of their stock go down
  - (C) It signals that they may be having trouble raising capital
  - (D) They are not against borrowing money but only when it is necessary
  - (E) None of these
  
2. When the face value of a note is the maturity value of the note, we are speaking of
  - (A) A simple interest note
  - (B) A simple discount note
  - (C) Either a simple interest note or a simple discount note
  - (D) Neither a simple interest note or a simple discount note
  - (E) A promissory note
  
3. The principal in a loan is always the sum actually received by the borrower when
  - (A) The loan is a simple interest loan
  - (B) The loan is a simple discount loan
  - (C) The loan is either a simple interest or a simple discount loan
  - (D) When the loan is something other than a simple discount or simple interest loan
  - (E) When any kind of a loan is made

4. When the borrower pays interest on the amount of money he repays rather than on the amount that he actually borrows, he has made a
  - (A) Simple interest loan
  - (B) A simple discount loan
  - (C) Either a simple interest or a simple discount loan
  - (D) Neither a simple interest nor a simple discount loan
  - (E) Any kind of promissory note
5. When the work proceeds is used, the loan is a
  - (A) Simple interest loan
  - (B) A simple discount loan
  - (C) Either a simple interest or simple discount loan
  - (D) Neither a simple interest nor a simple discount loan
  - (E) any kind of promissory note
6. Which of the following is an example of the "Banker's Rule"?
  - (A) Approximate days/360
  - (B) Approximate days/365
  - (C) Exact days/360
  - (D) Exact days/365
  - (E) None of these
7. Why is the banker's rule used?
  - (A) It results in the least amount of interest to the lender
  - (B) It results in the least amount of interest to the borrower
  - (C) It is most convenient to use
  - (D) It is required by federal law
  - (E) None of these
8. When the government computes interest, what method is used?
  - (A) Approximate days/360
  - (B) Approximate days/365
  - (C) Exact days/360
  - (D) Exact days/365
  - (E) It depends on whether they are collecting the interest or paying it as to the method used



9. One of the distinguishing features of a promissory note is that
- (A) It cannot be sold without the original maker's permission
  - (B) It can be sold and the interest rate re-negotiated
  - (C) It is payable on demand
  - (D) It can be rediscounted without changing the terms of the note
  - (E) None of these
10. From a legal point of view, what is the difference between a bank loan and a promissory note?
- (A) There essentially is no difference
  - (B) Promissory notes are always payable on demand
  - (C) Bank loans are usually at a higher rate of interest
  - (D) Bank rates are usually lower
  - (E) The time is usually longer for a bank loan
11. Banks rediscount notes because
- (A) It is very profitable for them to do so
  - (B) They are legally bound to do it
  - (C) It is a service for their good customers
  - (D) They can re-negotiate the interest rate, usually at a higher rate
  - (E) All of these
12. A person borrows money at a simple interest rate of 6% for a period of time. The bank discounts the note. The effective rate at which the borrower pays is
- (A) Less than 6%
  - (B) More than 6%
  - (C) 6%
  - (D) May be higher or lower than 6% depending on the amount borrowed
  - (E) Cannot be determined
13. Suppose the terms of payment on an invoice are 3/10, n/30 and a businessman decides it is worth his while to borrow money to take advantage of the discount. How long should he borrow it for?
- (A) 10 days
  - (B) 20 days
  - (C) 30 days
  - (D) It depends on how much he needs
  - (E) Cannot be determined with this information

14. The so-called "United States Rule" has to do with
- (A) Simple interest loans
  - (B) Simple discount loans
  - (C) Both simple discount and simple interest loans
  - (D) Partial payments
  - (E) None of these
15. The United States Rule is so called because
- (A) Its legality has been upheld by the U.S. Supreme Court
  - (B) It originated in the United States
  - (C) It is mostly used in the U.S.
  - (D) The U.S. Congress passed legislation authorizing its use
  - (E) None of these
16. What years did the Truth in Lending Law pass?
- (A) 1965      (B) 1969      (C) 1971      (D) 1972      (E) 1973
17. With regard to the level of interest a merchant may charge, the Law states that
- (A) It cannot be more than 18% per year
  - (B) It cannot be more than 12% per year
  - (C) No amount is mentioned, except that it cannot be exorbitant
  - (C) It can't exceed 1 1/2% per month
  - (E) No mention is made of the level of interest that can be charged
18. What is meant by an open ended credit account?
- (A) The time period of the credit is not definite
  - (B) More credit may be received before the first credit is entirely repaid
  - (C) The interest rate is open to change
  - (D) Both (A) and (B)
  - (E) (A), (B), and (C)

19. What are the stipulations as far as late charges are concerned under Truth in Lending?
- (A) They must be explicitly stated on the bill
  - (B) They need not be stated since customers are expected to make payments on time
  - (C) The late payment charge may not exceed 1% of the unpaid balance
  - (D) The late payment charge cannot exceed 1 1/2% of the average monthly balance
  - (E) None of these
20. When payment is made on an installment purchase, which of the following takes place?
- (A) The interest is taken off first and then the remainder is applied to the principal
  - (B) The whole payment goes toward principal and then interest is figured for your next installment
  - (C) The amount to be taken for interest may or may not be taken first depending on how much the installment payment is
  - (D) The interest is compounded and then deducted
  - (E) None of these
21. A person borrows \$200,000 from a bank for 2 years at 8% add-on interest. He then repays what amount?
- (A) \$216,000      (B) \$232,000      (C) \$200,000
  - (D) \$210,000      (E) None of these
22. The cash price for a refrigerator is \$300. It can also be purchased for no down payment and 18 monthly payments of \$20. The finance charges in this case are
- (A) Cannot be determined since no interest rate is given
  - (B) Depends on the monthly late charges
  - (C) \$60
  - (D) \$20
  - (E) None of these
23. A man bought a car for \$3200. He was given a \$900 trade in allowance on his old car and put down \$200 besides. He arranged a two-year loan on which the lender computed 6% simple interest. What is his monthly payment?
- (A) \$177.78      (B) \$127.78      (C) \$116.67      (D) \$126.67
  - (F) \$98      (F) None of these



24. In example 23, what is the total price of the car?  
(A) \$3200 (B) \$3400 (C) \$4300 (D) \$3452  
(E) None of these
25. What annual percentage rate must the lender disclose under the Truth in Lending (For ex. 23) Law?  
(A) 6% (B) 12% (C) 11% (D) 11 1/4%  
(E) 11 1/2%
26. A man was the maker of a 180-day, \$2000 note bearing interest at 6%. The note was dated March 5. On April 4 he paid \$800 toward his debt, on June 3 he paid \$500. How much of his first payment goes toward his principal and what will be his subsequent balance?  
(A) \$800 and \$1200 (B) \$740 and \$2260  
(C) \$10 and \$1210 (D) \$780 and \$1220 (E) None of these
27. In example 26, how much will the man owe when the note matures?  
(A) \$2000 (B) \$2060 (C) \$760 (D) \$732.93  
(E) None of these
28. How much money did the man in example 26 save by making these partial payments?  
(A) Nothing since he signed a 180-day note bearing interest at maturity  
(B) \$60  
(C) \$32.93  
(D) \$92.93  
(E) \$27.07
29. A bank note is discounted at 5% in order to take advantage of the cash discount on an invoice for \$987.63 with terms 3/15, n/30. What amount should he ask for from the bank?  
(A) \$987.63 (B) \$958 (C) \$960 (D) \$1015.26  
(E) None of these



30. The proceeds of a 60-day note were \$296. If the discount was computed on a face value of \$300, what discount rate was used?
- (A) 8%      (B) 4%      (C) 6%      (D) 5%      (E) None of these
31. A borrower signs a 120-day note for \$600. If the bank discounts the note at 5%, what will be the proceeds?
- (A) \$610      (B) \$630      (C) \$590      (D) \$570
- (E) None of these
32. For their own convenience, the Domestic Finance Co. computes on loans at 10% simple interest. What annual rate must they reveal under the Truth in Lending Law?
- (A) 10%      (B) 18%      (C) \$18.25%      (D) 17%
- (E) Depends on the length of the payment schedule
33. Which of the following pairs are correct?
- (A) Actuarial and effective, and nominal and simple
- (B) Simple and effective, and nominal and actuarial
- (C) Actuarial and simple, and effective and nominal
- (D) Simple and annual, and effective and nominal
- (E) Simple and effective, and annual and nominal

## BIBLIOGRAPHY

- Allinsmith, W. "Moral Standards: II. The Learning of Moral Standards." In Inner Conflict and Defense. Edited by D. R. Miller and G. E. Swanson. New York: Holt, 1960.
- Allport, Floyd. Institutional Behavior. Chapel Hill: University of North Carolina Press, 1933.
- Allport, Gordon W. Pattern and Growth in Personality. New York: Holt, Rinehart, and Winston, 1961.
- "Amount of Cheating on U.S. Campuses." U.S. News and World Report 58 (February 1965):10.
- Anderson, H. H. Les Cliniques Psychologiques pour l'enfance aux Etats-unis et l'oeuvre du Dr. Healy. Neuchatel et Paris: Del chaux et Niestle, 1929.
- Anderson, William F., Jr. "Attitudes of University Students Toward Cheating." Journal of Educational Research 50 (April 1957):581-88.
- Astin, A. W.: Panos, R. J.: and Creager, J. A. National Norms for Entering College Freshmen, Fall 1966. American Council on Education Research Reports, 1967, 2(1).
- Barbu, Z. Contributions to the Psychology of Honesty. Cluj: Editura Institutului de Psychologie at Universitatii, 1940.
- \_\_\_\_\_. "Studies in Children's Honesty." Quarterly Bulletin of British Psychological Society 2 (1951): 53-57.

- Barocas, Ralph, and Christensen, Donald. "Impression Management, Fakeability, and Academic Performance." Journal of Counselling Psychology 5 (1968):569-71.
- Bathurst, J. E. "Written Tests of Honesty (Integrity)." Public Personnel Studies 7 (July 1929):98-106.
- Beller, Emanuel K. "Two Attitude Components in Younger Boys." Journal of Social Psychology 29 (1949):137-151.
- Berkowitz, Leonard. The Development of Motives and Values in the Child. New York: Basic Books Inc., 1964.
- Bird, Charles. "The Detection of Cheating in Objective Examinations." School and Society 25 (February 1927):262-62.
- \_\_\_\_\_. "An Improved Method of Detecting Cheating in Objective Examinations." Journal of Educational Research 19 (May 1929):341-48.
- Black, D. B. "Falsification of Reported Examination Marks in a Senior University Education Course." Journal of Educational Sociology 35 (April 1962):346-354.
- Bonjean, C. M., and McGee, R. "Scholastic Dishonesty Among Under-Graduates in Differing Systems of Social Control." Sociology of Education 38 (1965):127-137.
- Bowers, William J. Student Dishonesty and Its Control in College. New York: Bureau of Applied Social Research, Columbia University, 1964.
- Brownell, Herbert C. "Mental Test Traits of College Cribbers." School and Society 27 (June 1928):764.
- Burton, R. V. "Generality of Dishonesty Reconsidered." Psychological Review 70 (1963):481-499.
- Cabot, Richard C. Honesty. New York: The Macmillan Co., 1938.



Campbell, William Giles. A Comparative Investigation of Students Under an Honor System and a Proctor System in the Same University. Los Angeles: University of Southern California, 1935.

\_\_\_\_\_. "Measurement in Determining the Personality and Behavior of the College Cribber." Education 53 (March 1933):403-408.

\_\_\_\_\_. "Student Honesty as Revealed by Reporting of Teacher's Errors in Grading." School and Society 33 (January 1931):97-100.

Campbell, William Giles, and Koch, Helen Lois. "Student Honesty in a University with an Honor System." School and Society 31 (February 1930):232-240.

Canning, Ray R. "Does an Honor System Reduce Classroom Cheating? An Experimental Answer." Journal of Experimental Education 24 (June 1956):291-96.

Cavanaugh, Joseph A. "A Survey of Opinion on Examinations." Educational Research Bulletin 29 (May 1950):120-125.

Centra, John A. "College Freshman Attitudes Toward Cheating." Personnel and Guidance Journal 48 (January 1970):366-73.

Chambers, E. V. "A Study of Dishonesty Among the Students of a Parochial Secondary School." Pedagogical Seminary 33 (1926):717-728.

Christensen, Harold T. "An Experiment in Honesty." Social Forces 26 (March 1948):298-302.

Cohen, Helen A.; Roth, Robert M.; and Garfield, S. Jeffrey. "A Correlative Study of Cheating in College Students." Journal of Educational Research 61 (December 1967):4.

"The Compleat Cheat." Time, 3 February 1947, pp. 75-76.

Corey, Stephen M. "Professed Attitudes and Actual Behavior." Journal of Educational Psychology 28 (1937):271-80.

Cowen, Ronald G. A Sociology of Education. New York: Appleton-Century-Crofts, 1965.



- Dabney, Virginus. "Cheating Can be Stopped." Saturday Review, 21 May 1966, pp. 68-69, 77.
- Danforth, William H. "Management and Accountability in Higher Education." AAUP Bulletin 59 (June 1973): 135-38.
- David, Kenneth H. "Sex Differences in Cheating and Judgement Discrepancy on Barron's ES Scale." Perceptual and Motor Skills 24 (1967):1154.
- Dickenson, Henry F. "Identical Errors and Deception." Journal of Educational Research 38 (March 1945):534-542.
- \_\_\_\_\_. "Identical Errors Reveal Deception." Education 67 (September 1946):44-52.
- \_\_\_\_\_. "Patterned Sectioned Pupils in Lieu of Equivalent Test Forms for Classroom Testing." Journal of Educational Research 33 (November 1939):183-88.
- Dienstbier, Richard A. "The Role of Anxiety and Arousal Attribution in Cheating." Journal of Experimental Social Psychology 8 (1972):168-179.
- Dienstbier, Richard A., and Munter, P. O. "Cheating as a Function of the Labeling of Natural Arousal." Journal of Personality and Social Psychology 17 (1971):208-13.
- Drake, Charles A. "Why Students Cheat." Journal of Higher Education 12 (November 1941):418-420.
- Eddy, Edward D., Jr. The College Influence on Student Character. Washington, D.C.: The American Council on Education, 1959.
- English, Horace B. "Bluffing in Examinations." American Journal of Psychology 40 (1928):350.
- Fenton, Norman. "An Objective Study of Student Honesty During Examinations." School and Society 26 (September 1927):341-44.

- Finkenbinder, E. O. "A Measure of the Amount of Cheating by College Students." Proceedings of the Iowa Academy of Sciences, 1933.
- Fischer, Margaret B., and Noble, Jeanne L. College Education as Personal Development. Englewood Cliffs, N.J.: Prentice-Hall Inc., 1960.
- Frances, Sister Mary Adele. "Not All Cheat on Exams." Catholic Educational Review 61 (January 1963):32-36.
- Freeman, Linton C., and Turkoz, Ataov. "Invalidity of Indirect and Direct Measures of Attitude Toward Cheating." Journal of Personality 28 (December 1960): 443-47.
- Frymier, Jack R. "Faculty and Students Perceptions of Cheating." Journal of Educational Research 54 (November 1960):118-120.
- Gavit, John Palmer. "The Honor System." School and Society 25 (March 1927):289-292.
- Geiger, J. R. "The Educational Value of the Honor System." School and Society 21 (May 1925):516-522.
- Gillentine, Flora Myers. "Why Do College Students Cheat?" Peabody Journal of Education 15 (July 1937):15-17.
- Goldsen, Rose K.; Rosenberg, M.; Williams, R. M.: and Suchman, E. What College Students Think. Princeton, N.J.: D. Van Nostrand, 1960.
- Gundlach, Ralph A. "A Method for the Detection of Cheating in College Examinations." School and Society 22 (August 1925):215-16.
- Gross, M. Mynette. "The Effect of Certain Types of Motivation on the Honesty of Children." Journal of Educational Research 40 (October 1946) 133-140.
- "The Hard Way." Newsweek, 25 July 1966, p. 86.

- Harp, John, and Taietz, Phillip. "Academic Integrity and Social Structure: A Study of Cheating Among College Students." Social Problems 13 (Spring 1966):365-373.
- Harrington, E. R. "Observations on Cheating." Clearing House 35 (February 1961):354-56.
- Hartshorne, Hugh; May, Mark A.; and Shuttleworth, F. K. Studies in Deceit. New York: Macmillan, 1928.
- Healy, W. Honesty. New York: Bobbs-Merrill, 1915.
- Henson, Kenneth T. "Accountability and Performance-Based Programs in Education: Some Pros and Cons." Intellect 102 (January 1974):250-252.
- Herman, A. L. "College Cheating." Journal of Higher Education 37 (May 1966):260-66.
- Herricks, Marvin L. "Changing Mores Concerning Cheating on Examinations." School and Society 86 (November 1958): 413.
- Hetherington, Mavis, and Feldman, Solomon. "College Cheating as a Function of Subject and Situational Variables." Journal of Educational Psychology 55 (August 1964):212-18.
- Hill, G. E. "Cheating Among Delinquent Boys." Journal of Juvenile Research 18 (1934):169-174.
- Hillbrand, E. K. "Cheating in College." School and Society 26 (December 1927):748-750.
- Hines, Harlan C. "The Honor System and the Normal Curve." School and Society 26 (October 1927):481-85.
- Hochreich, Dorothy J., and Rotter, Julian B. "Have College Students Become Less Trusting." Journal of Personality and Social Psychology 15 (1970):211-214.
- Horrocks, John E. The Psychology of Adolescence Behavior and Development. Boston: Houghton Mifflin Co., 1962.



- Hottleman, Girard D. "Accountability Movement." Education Digest 39 (April 1974):17-20.
- Hoult, Thomas F., and Hudson, John W. "Blindness and Sightedness as Factors in Student Cheating: An Experiment." California Journal of Educational Research 15 (September 1964): 199-204.
- Howells, T. H. "Factors Influencing Honesty." Journal of Social Psychology 9 (February 1938):97-102.
- Jacobson, Leonard I.; Berger, Stephen E.; and Millham, Jim. "Individual Differences in Cheating During a Temptation Period When Confronting Failure." Journal of Personality and Social Psychology 15 (1970):48-56.
- Johnson, Richmond E., and Klores, Malcolm S. "Attitudes Toward Cheating as a Function of Classroom Satisfaction and Peer Norms." Journal of Educational Research 62 (October 1968).
- Keehn, J. D. "Unrealistic Reporting as a Function of Extraverted Neurosis." Journal of Clinical Psychology 12 (January 1956):61-63.
- King, Edith W. "The Cadet Honor Code Incident: Implications for Higher Education." Teachers College Record 70 (February 1969).
- Knowlton, J., and Hamerlynck, L. "Perception and Deviant Behavior: A Study of Cheating." Journal of Education 58 (December 1967):379-85.
- Krueger, William C. F. "Student's Honesty in Correcting Grading Errors." Journal of Applied Psychology 31 (October 1947):533-35.
- LaPiere, Richard T. "Attitudes vs. Actions." Social Forces 13 (1934):230-237.
- "Larceny in Everyday Life." Time, 9 September 1966, pp. 26-27.



- Lewis, David M. "Cheating as Related to the Social System in a University." Ph.D. dissertation, Western Michigan University, Kalamazoo, Michigan, 1965.
- Lindgren, Henry Clay. Educational Psychology in the Classroom. New York: John Wiley and Sons, Inc., 1967.
- Lodge, W. J. "Classroom Cheating--A Measure of Children's Character or Teacher's Attitudes?" California Journal of Educational Research 2 (1951):63-66, 331.
- Luke, O. S. "Can We Reduce Cheating in the Classroom?" Junior College Journal 24 (November 1953):169-178.
- Lyman, R. L. "The Problem of Student Honor in Colleges and Universities." School Review 35 (April 1927):253-271.
- MacDougall, G. R. "Cheating: Three Ways to Handle the Problem." Clearing House 30 (February 1956):332-34.
- MacKinnon, D. W. Violation of Prohibitions. In H. A. Murray, Explorations in Personality. New York: Oxford University Press, 1938.
- McQueen, Robert. "Examination Deception as a Function of Residual, Background, and Immediate Stimulus Factors." Journal of Personality 25 (1957):643-650.
- Mann, Horace. Issues in Education. Edited by Bernard Johnson. Boston: Houghton-Mifflin Co., 1964.
- Marvin, Arthur D. "Dishonesty in the American School and its Cause." Education 44 (January 1924):290-98.
- Mathews, C. O. "The Honor System." Journal of Higher Education 3 (November 1932):411-415.
- Merritt, Curtis B., and Fowler, Richard G. "The Pecuniary Honesty of the Public at Large." Journal of Abnormal and Social Psychology 43 (January 1948):90-93.
- Merton, Robert K. Social Theory and Social Structure. New York: The Free Press of Glencoe, 1963.

- Miller, George Frederick. "An Experimental Test of Intellectual Honesty." School and Society 26 (December 1927):852-54.
- Mills, Judson. "Changes in Moral Attitudes Following Temptation." Journal of Personality 12 (1958):517-531.
- Morehouse, Frances M., and Coffman, Lotus D. The Discipline of the School. New York: D. C. Heath and Co., 1914.
- Mulcahy, Gloria Lorraine. "The Relationship Between Overt Verbal Attitude Responses Toward Cheating Behavior, Achievement Needs, and Cheating on Test Items." Ph.D. dissertation, University of Maryland, 1967.
- Palmer, O. "What to do when Children Cheat." Parents' Magazine, January 1966, pp. 38-39.
- Parr, F. W. "The Problem of Student Honesty." Journal of Higher Education 7 (June 1936):318-326.
- Patrick, James R. "Objective Examinations and Habits of Honesty." School and Society 34 (September 1931): 320-21.
- Persing, K. M. "Morals and Chemistry." Educational Review 72 (1926):164-168.
- Peterson, Iver. "Grade Drive Warps Lives." Washington Star-News, 21 November 1974, p. A3.
- Piaget, Jean. The Moral Judgement of the Child. New York: The Free Press of Glencoe, 1948.
- Platt, Charles A. "Curbing College Cheating." Christian Century, 7 June 1961, pp. 714-715.
- Rebelsky, Freda Gould. "An Inquiry into the Meanings of Confession." Merrill-Palmer Quarterly 9 (1963): 287-294.
- Reid, John E., and InBau, Fred E. Truth and Deception. Baltimore: The Williams and Wilkins Co., 1966.



- Rettig, Solomon, and Rawson, Harvey E. "The Risk Hypothesis in Predictive Judgements of Unethical Behavior." Journal of Abnormal Social Psychology 66 (1963): 243-248.
- Rogosin, H. "What About Cheating on Examinations and Honesty?" School and Society 74 (December 1951): 402-403.
- Schachter S., and Latane, B. "Crime, Cognition, and the Autonomic Nervous Systems." In Nebraska Symposium on Motivation, pp. 221-273. Edited by D. Levine. Lincoln: University of Nebraska Press, 1964.
- Schnepp, Alfred F. "College Students' Principles of Honesty." Journal of Higher Education 11 (February 1940):81-84.
- Schwartz, S. H.; Feldman, K. A.; Brown, M. E.; and Heingartner, A. "Some Personality Correlates of Construct in Two Situations of Moral Conduct." Journal of Personality 37 (1969):41-57.
- Sheeder, Franklin I. "The Honor Spirit on the College Campus." Religious Education 27 (October 1932):735-741.
- Sherrill, David; Salisbury, J. L.; Horowitz, Bernard; and Friedman, S. Thomas. "Classroom Cheating: Consistent Attitude, Perceptions, and Behavior." American Educational Research Journal 8 (May 1971):503-510.
- Shirk, Evelyn, and Hoffman, R. W. "The Academic Setting of the Dishonest Student." Improving College and University Teaching 9 (Summer 1961):130-134.
- Smith, Burke M. "The Polygraph." Scientific American 216 (January 1967):3-9.
- Smith, Charles P.; Ryan, Edward R.; and Diggins, Dean R. "Moral Decision Making; Cheating on Examinations." Journal of Personality 40 (December 1972):640-660.
- Speicher, Earl E. "Cribbing in College." Christian Education 18 (June 1935):305-308.

- Steininger, Marion; Johnson, R. C.; and Kirts, D. K.  
 "Cheating on College Exams as a Function of Situationally Aroused Anxiety and Hostility." Journal of Educational Psychology 55 (December 1964):317-324.
- Stern, Bernard H. "What Should be Done About Cheating in College?" Educational Forum 27 (November 1962):79-83.
- Stillwell, Hart. "Why They Cheat." Nation 173 (August 1951):133.
- Stouffer, Samuel A. "Analysis of Conflicting Social Norms." American Sociological Review, December 1949.
- Strang, Ruth. Background and Behavior of Students in College and Secondary Schools. New York: Harper, 1937.
- Stroup, Herbert. "The Touchables." Christian Century, 22 March 1961, pp. 352-354.
- Svadkovskii, I. F. "The Training of Honesty in Children." Semia i Shkola 2 (1949):7-9.
- Tallman, Irving. "Adaption to Blocked Opportunity: An Experimental Study." Sociometry 29 (June 1966):121-134.
- Tanz, Ralph D., and Tanz, Rose T. "The Honor System in United States and Canadian Medical Schools." Journal of Medical Education 35 (May 1960):440-446.
- Thelin, E, and Scott, P. C. "An Investigation in Bluffing." American Journal of Psychology 40 (1928):613-19.
- Trabue, Ann. "Classroom Cheating--An Isolated Phenomenon?" Educational Record 43 (October 1962):309-316.
- Tuttle, H. S. "Honesty Trends in Children." Journal of Educational Sociology 5 (1931):233-239.
- \_\_\_\_\_. "Testing the Curriculum in its Natural Setting." Religious Education 24 (1929):173-75.



- Uhlig, George E., and Howes, Barry J. "Attitude Toward Cheating and Opportunistic Behavior." Journal of Educational Research 60 (May-June 1967):411-412.
- Wahlquist, John T. "The Honor System in American Colleges and Universities." School and Society 37 (June 1933): 757-760.
- Weinstein, George. "Does Your Child Cheat in School?" Look, 24 March 1953, p. 42.
- Wesley, Donald A. "Prevent Cheating: Some Useful Tricks of the Trade." Clearing House 39 (December 1964): 233-34.
- White, William F.; Zielonka, Alfred W.; and Gaier, Eugene L. "Personality Correlates of Cheating Among College Women Under Stress of Independent-Opportunistic Behavior." Journal of Educational Research 61 (October 1967):68-70.
- Williams, F. N. "Cheating in the Classroom." Improving College and University Teaching, Summer 1969, pp. 183-184.
- Woods, Roy C. "Factors Affecting Cheating and Their Control." Proceedings of the West Virginia Academy of Science 29 (1957):79-82.
- Wright, J. C., and Kelly, R. "Cheating: Student/Faculty Views and Responsibilities." Improving College and University Teaching, 1974, pp. 31-34.
- Wrightsmann, Lawrence S., Jr. "Cheating--A Research Area in Need of Resuscitation." Peabody Journal of Education 37 (November 1959):145-49.
- Yepsen, Lloyd N. "The Reliability of Self-Scored Measures." School and Society 26 (November 1927):657-660.
- Zastrow, Charles H. "Cheating Among College Graduate Students." Journal of Educational Research 64 (December 1970):157-160.