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An Empirical Examination of the Relationship Between the Course Instructor, Student Mathematics Skills, and Course Grade in First College-Level Accounting Class

Hamid Pourjalali (Ph.D)

Department of Accounting, The University of Southwestern Louisiana

Janet Kimbrell (Ph.D) & T. Sterling Wetzel (Ph.D)

School of Accounting Oklahoma State University

ABSTRACT

Previous research has shown a relationship between the success of students in the first college-level accounting course and variables such as level of motivation and previous accounting experience. This research extends previous studies in three avenues.

First, it provides further evidence on the differences between the performances of female and male students.

Second, it suggests that the interactive effect of some of the explanatory variables should be considered for the models that

are constructed to predict success in the first college-level accounting course.

Finally, this study provides a firm base for testing the effect of the course instructor and the class meeting time on student performance. Additionally, the study provides a discriminant model to predict failing (Passing) students in the first college-level accounting course.

The findings of this study suggest that those students who have taken algebra and calculus prior to the first accounting course outperform other students. The results also provide evidence that the course instructor and the class meeting time affect student success when measured by the course letter grade; if only a pass/fail scale is used, however, the instructor and class meeting time effects are reduced.

INTRODUCTION

Several papers have examined the variables that affect the performance of accounting students in different accounting courses (e.g., Baldwin and Howe,1982; Keef, 1988; and Eskew and Faley, 1988). The importance of these studies and of knowing these variables is rather obvious for all educators involved with accounting courses and need not be emphasized here. previous studies, however, have shown conflicting results in some respects. For example, although most of the studies find that male and female students perform differently (e.g., Mutchler, Turner, and

Williams, 1987; Hartwell and Izard, 1992), Lipe's (1989) results do not confirm this difference. In addition, the Mutchler, Turner, and Williams (1987) study showed that females outperformed males and that of Hartwell and Izard (1992) showed that males outperformed females. Another common problem of some prior studies has resulted from their research design. To increase the internal validity, the number of instructors for the course was limited (usually to one, e.g., Eskew and Faley, 1988) and consequently, these studies fail to address the effect of differences such as those to the instructor and class meeting time on the student performance.

Knowledge of variables (factors) that affect accounting student performance can be useful to accounting educators in three ways. First, educators can influence the known variables in order to improve a student learning curves. For example, if it is shown that the student's math abilities have a direct effect on their grades in the first college-level accounting course, accounting departments should ensure that students have been exposed to those math skills prior to their enrolling in college-level accounting courses.

A second use, related to the above, is that the drop rate in the first accounting course may be reduced. While drop rates vary among universities, it has typically been high in the first accounting course (e.g., Eskew and Faley, 1988, cite a drop rate of 16%, and the institution in this study has shown a drop rate of approximately 20%). This situation results in huge costs to the university, both in money and time. Improving the success rate of students would reduce these costs.

Another use of this knowledge could be to screen accounting students. In the past, most accounting departments have been fortunate enough to attract a large number of students. Using known factors, educators can screen these applicants by predicting their performance in their first accounting course. Such an evaluation of potential accounting majors could result in cost and time savings, since previous studies show that those who perform well in the first college - level accounting course also perform well in upper-level accounting courses (e.g., Dockweiler and Wills, 1984).

The purpose of this study is threefold. First, this study measures the effect of math knowledge on the student's grade in the first college-level accounting course. Second, it appraises the instructor and class meeting time effects on the student's performance, and finally, it develops a discriminant function to predict the student's expected grades given a series of explanators variables. The organization of this paper is as follows. Section I describes the sample, and Section II discusses the variables and the design of the study. Empirical results are presented in Section III, with concluding remarks in Section IV.

I. DESCRIPTION OF THE SAMPLE

Approximately half of the students enrolled in the first financial accounting class of a midwestern university during a fall semester were included in the study.

The normal enrollment during a fall semester for this course is between 850 and 900 students. The text, syllabus, and number of exams were the same for all sections; however, different instructors taught the course, and the sections met at different times during the day. No evening classes were included in the sample. All classes were taught in similar facilities in the same building. Complete information for this study was available for 429 students. ACT Scores, however, were obtained for only 195 of the 429. Table I presents a composite of the sample for males and females. This table also shows the grade distribution of the students. The subsample that includes ACT scores has a higher GPA, which indicates that the subsample is biased toward better students. As a result, we decided to analyze the sample without ACT scores2. Table II shows the sample distribution from the fail/pass perspective.

GRADE	MALE		FEMALE		TOTAL	
	WITH ACT	WITHOUT ACT	WITH ACT	WITHOUT ACT	WITH ACT	WITHOUT ACT
A	19	31	26	39	45	70
B	17	45	34	58	51	103
C	22	44	27	63	49	107
D	10	29	9	17	19	46
F & WITHDRAWALS	22	69	9	34	31	103
TOTAL	90	218	105	211	195	429
GPA	2.01	1.72	2.56	2.24	2.31	1.28

Tabel I - The Sample: Arranged According to Students' Final Grades

TABLE II

THE SAMPLE: ARRANGED ACCORDING TO STUDENTS'
FINAL PASSING/FAILING GRADES

GRADE	MALE		FEMALE		TOTAL	
	WITH ACT	WITHOUT ACT	WITH ACT	WITHOUT ACT	WITH ACT	WITHOUT ACT
PASSING (GRADES HIGHER THAN "C")	58	120	87	160	145	280
FAILING (GRADES LOWER THAN "C")	32	98	18	51	50	149
TOTAL	90	218	105	211	195	429

II. DESIGN OF THE STUDY

prior studies have shown that math ability is significantly and directly related to student performance in accounting courses (for example, Collier and McGowan,1989). Therefore, the students' arithmetical and calculus abilities as of the beginning of the semester were evaluated by way of a simple test. The concepts tested were similar to those which would be used in an accounting course (e.g., conversion of fractions to percentages). A sample of the questions from this test is shown in the Appendix. The test result for each student was divided into two parts according to the type of questions (arithmetic or algebra and calculus). The percentage of the arithmetic questions that the student missed is shown in the variable ARITH, and the percentage of algebra and calculus questions missed is shown in ALGEB. ARITH and ALGEB served as independent variables.

ARITH: Number of mistakes in a simple arithmetic test divided by total possible points.

ALGEB: Number of mistakes in a simple algebra and calculus test divided by total possible points.

Two additional independent variables represented the students' prior-to-college knowledge of mathematics. These variables were:

HSALG: Dummy variable; equal to one if the student had had high school algebra, otherwise equal to zero.

HSMATH: Number of high school math courses taken.

To find the effect of college math courses, the following three variables were included in the model:

COLMATH: Number of college math courses taken.

COLALG: Dummy variable; equal to one if the student had had college algebra, otherwise equal to zero.

COLCAL: Dummy variable; equal to one if the student had had college calculus, otherwise equal to zero.

Given the definitions of the above explanatory variables and the outcomes of previous research, we hypothesized that the explanatory variables ARITH and ALGEB would affect students, grades negatively and the other variables - HSMATH, HSALG, COLMATH, COLALG, and COLCAL - would affect the students' grades positively. We also expected a high degree of multicollinearity between COLMATH and COLALG and between COLMATH and COLCAL.

Another set of variables was related to the effect of differences among instructors. To control for these differences, four dummy variables (for five different instructors) were incorporated as follow:

INST1: Dummy variable; equal to one if the student's instructor was instructor number one, otherwise equal to zero.
INST2: Dummy variable; equal to one if the student's instructor was instructor number two, otherwise equal to zero.
INST3: Dummy variable; equal to one if the student's instructor was instructor number three, otherwise equal to zero.
INST4: Dummy variable; equal to one if the student's instructor was instructor number four, otherwise equal to zero[3].

Hereafter, the instructor effect represents the effect of the instructor (e.g., his/her attitude, teaching style, grading method, and so on), but not the class meeting time. Since each instructor effect could be a surrogate for the effects of several other variables, and one cannot predict a priori how an instructor will affect a student's performance, no specific direction in students' grades was predicted as a result of instructor effect.

Also, three dummy variables measured the effect of the class meeting time on the students' grades. Three different time periods were chosen, using the university's experience as to class times preferred by students. As students avoid taking early morning classes (7:30 am to 9:30 am), those class times were grouped together (TIME1) and it was expected that the class meeting time effect for TIME1 would be negatively related to the students' grades. In addition' two other class times were defined-TIME2, which included the most favorable times (9:30 am to 1:30 pm) and TIME3, which was less favorable (1:30 pm to 5:45 pm). It was expected that the most favorable class meeting time would have a positive effect on the students' grades. The following summarizes the class-meeting-time dummy variables:

TIME1:	Dummy variable; equal to one if the student's class time was from 7:30 am to 9:30 am.
TIME2:	Dummy variable; equal to one if the student's class time was from 9:30 am to 1:30 pm.
TIME3:	Dummy variable; equal to one if the student's class time was from 1:30 pm to 5:45 pm.

To test if the gender of students has explanatory power for their grades, the sex of the students was considered as another independent variable. It was expected that female students would outperform male students, as that has been our anecdotal experience and other studies have shown this result. A dummy variable SEX was used, with one representing females and zero representing males.

III. RESULTS

The effects of the independent variables mentioned previously were measured using ordinary least squares (OLS) regression analysis. As different instructors had their own (and consequently different) ways of weighing the various components of the total grade, the final grade for the course (versus, for example, total grade for quizzes and tests) was used as the dependent variable.4 As a result, the dependent (response) variable takes on an ordinal value, which allows the use of the OLS regression analysis. The results. The results of the regression are shown in panel A of Table III. As is shown in the panel,the SEX variable is statistically significant at a level of 0.05. Since the dummy variable SEX takes one for female and zero for male students, the sign of the coefficient for SEX suggests that female students outperform male.students in the first college-level accounting corrse. This result is similar to that of Mutchler, Turner, and Williams (1987), who show that the gender of the students affects their performances.

The result observed for the SEX variable led to a separate analysis for male and female students. The outcome of these analyses is shown in pamels B and C of Table III. Although the results of panels B and C are in some respects similar, the instructor effect is considerably different for males and females. When the INST variables which were significant for males and females are compared in Table III (panels B and C) , the most noticeable point is the effect observed from the only female instructor (INST) on female students. The results of this study show that this female instructor had a positive effect on the female students, but had no significant effect on the male students; also one of the male instructors (INST2) had a negative effect on the males, but the effect on the females was not significant. INST3 and INST4 had a positive effect on the females, but did not significantly influence the males. While no concrete conclusions can be drawn about the effect of male versus female instructors on male and female students, these results indicate that some factor (I.e.,teaching style, testing styles, etc.) affects the performances of male and female students differently.

Also, COLALG and COLCAL are significant for female students, whereas HSALG is significant for males[5]. However, both ARITH and ALGEB are significant for both male and female students. The signs of the significant variables are all similar to the expected signs.

Another method of analyzing the data is to divide the sample into two groups, one consisting of those who failed the course and the other who passed the course (fail/pass). Students who made at least a "C" for the course were defined as passing students; all others were failing students. When the dependent variable has a discrete format, it is appropriate to use Probit or Logit analysis.

Table II shows the sample when the response variable is stated as fail/pass (fail being one and pass being zero).Table IV demonstrates the results of the Probit analysis. panels A, B, and C represent the analyses for all. male, and female students respectively.The Logit analysis results were essentially the same as the Probit analysis outcomes.

When Tables III and IV are compared, the following points can be drawn.

TABLE III

RESULTS OF OLS ANALYSIS*

Panel A: all students are included; gender is included as the independent variable:

Number of observations: 429
R^2 : 0.30
Adjusted R^2 : 0.28

Variables significant at .05 level are:

VARIABLES:	INTERCEPT,	ARITH,	ALGEB,	HSALG,
OBSERVED SIGNS	+	-	-	+
EXPECTED SIGNS	**	-	-	+

VARIABLES:	COLALG,	INST1,	SEX
OBSERVED SIGNS	+	+	+
EXPECTED SIGNS	+	**	+

Panel B: only male students are included.

Number of observations: 218
R^2 :0.32
Adjusted R^2 :0.28

Variables significant at .05 level are:

VARIABLES:	INTERCEPT,	ARITH,	ALGEB,	HSALG,	INST2
OBSERVED SIGNS	+	-	-	+	-
EXPECTED SIGNS	**	-	-	+	**

Panel C: only female students are included.

Number of observations: 211
R^2 :0.33
Adjusted R^2 :0.29

Variables significant at .05 level are:

VARIABLES:	INTERCEPT,	ARITH,	ALGEB,	COLALG,
OBSERVED SIGNS	+	-	-	+
EXPECTED SIGNS	**	-	-	+

VARIABLES:	COLCAL,	INST1,	INST3,	INST4
OBSERVED SIGNS	+	+	+	+
EXPECTED SIGNS	+	**	**	**

Notes:

*Course Grade is the dependent variable.

**The sign cannot be predicted.

ARITH = Number of mistakes in a simple arithmetics test divided by total possible points.

ALGEB = Number of mistakes in a simple Algebra and Calculus test divided by total possible points.

HSMATH = Number of high school math courses taken prior to college.

HSALG = Dummy variable; equal to one if the student has had high school algebra, otherwise equal to zero.

COLMATH = Number of college math courses taken.

COLALG = Dummy variable; equal to one if the student has had college algebra, otherwise equal to zero.

COLCAL = Dummy variable; equal to one if the student has had college calculus, otherwise equal to zero.

INST1 = Dummy variable; equal to one if the student's instructor was instructor number one, otherwise equal to zero.

INST2 = Dummy variable; equal to one if the student's instructor was instructor number two, otherwise equal to zero.

INST3 = Dummy variable; equal to one if the student's instructor was instructor number three, otherwise equal to zero.

INST4 = Dummy variable; equal to one if the student's instructor was instructor number four, otherwise equal to zero.

(Although students had five different instructors for the course, it is not necessary to introduce a new dummy variable for the fifth instructor. The intercept of the regression captures the effect of the fifth instructor. As shown in the above table, one may suggest that the fifth instructor has had a significant effect on the students' grade in Panels A, B, and C.

TIME1 = Dummy variable; equal to one if the student's class time was from 7:30 am to 9:30 am.

TIME2 = Dummy variable; equal to one if the student's class time was from 9:30 am to 1:30 pm

TIME3 = Dummy variable; equal to one if the student's class time was from 1:30 pm to 5:45 pm.

SEX = Dummy variable; equal to one if the student is female, otherwise zero.

TABLE IV

THE RESULTS OF THE PROBIT ANALYSIS*

Panel A: all students are included; gender is included as the independent variable:

Variables significant at .05 level are:

Number of observations: 429

VARIABLES:	ARITH,	HSALG,	SEX
OBSERVED SIGNS	-	+	+
EXPECTED SIGNS	-	+	+

Panel B: only male students are included.

Variables significant at .05 level are:

Number of observations: 218

VARIABLES:	ARITH,	INST2
OBSERVED SIGNS	-	+
EXPECTED SIGNS	-	**

Panel C: only female students are included.

Variables significant at .05 level are:

Number of observations: 211

VARIABLES:	ARITH,	ALGEB,	COLALG	INST1,	INST3
OBSERVED SIGNS	-	-	+	+	+
EXPECTED SIGNS	-	-	+	**	**

Notes:

* Fail/Pass Grade is the dependent variable.

See notes on Table III

1) In Table III Panel A, ALGEB and COLALG are significant, while they are no significant in Table IV. The only course that remains statistically singnificant in both tables in HSALG. While the SEX variable remains significant (females outperform males)in both tables, when only failing or passing the course is

considered, the instructor effect is reduced (INST 1 and possibly the fifth instructor whose effect was captured in INTERCEPT in Talbe III and not present in Table IV, Panel A).

2) Panels B and C in the two tables show (a) a reduction in the importance of the math background for both male and female students and (b) a reduction in the importance of the instructor effect on whether the student passed or failed the course.[6] Interestingly enough, the effect of ARITH continues in all panels of Tables III and IV.

Principal Commponent (Factor) analysis

Some of the independent variables have shown a high degree of collinearity COLMATH, COLALG, and COLCAL. The principal component analysis groups those variables (fators) that are highly correlated into components that are free of collinearity problems. Also the analysis provides insights into any meaningful factors explaining the variance observed in independent variables. Tabel V shows the results of the principal component (factor)analysis.

Not surprisingly, the first factor (eigenvector) represents the student's mathematatie skills (ARITH and ALGEB scores combined with mathematics courses taken in college and high school). All the signs in this factor are the predicted signs for the math - related variables. So the interpretation of the first factor is fairly simple. The seventh factor also represents a math skill

TABLE V

THE RESULTS OF THE FACTOR ANALYSIS

VARIABLE	FACTR1	FACTR2	FACTR3	FACTR4	FACTR5	FACTR6	FACTR7
ARITH	-.36	+.04	-.06	+.37	+.02	+.18	-.03
ALGEB	-.39	-.02	+.08	+.31	+.13	+.31	+.07
HSMATH	+.34	-.04	+.17	-.16	+.16	-.04	+.35
HSALG	+.13	+.02	+.32	+.04	+.18	+.18	+.72
COLMATH	+.48	+.08	-.03	+.24	+.01	+.17	-.21
COLALG	+.38	+.04	+.04	+.38	+.09	+.22	-.01
COLCAL	+.42	+.01	+.03	-.03	+.07	+.13	+.36
INST1	+.12	+.04	-.17	+.52	-.32	-.48	+.25
INST2	-.10	-.03	+.27	+.03	+.72	-.17	-.21
INST3	-.02	+.51	-.02	-.28	-.15	+.26	-.03
INST4	-.01	-.33	+.27	-.24	-.41	+.35	+.04
TIME1	+.04	+.62	+.02	-.05	+.01	-.06	+.07
TIME2	-.06	-.42	-.54	-.06	+.18	+.21	+.12
TIME3	-.02	-.21	+.62	+.14	-.23	-.19	-.23
SEX	-.03	+.10	+.08	+.31	-.06	+.47	-.06
eigenvalue:	2.91	2.22	1.65	1.37	1.32	1.15	1.04
proportion:	.19	.15	.11	.09	.09	.08	.07

Notes:

1) The above factors were chosen since their eigenvalues were larger than one. The above factors explain 78% of the variation in the independent variables.
2) Number of observation for the above analysis is 429.
3) Also see notes on Table III.

factor; however, the signs of the variables do not all agree with the predicted singns (e. g., COLMATH). Factors two and five represent the interaction between class meeting times and instructors. These factors represent the specific conditions that resulted from the instructor's teaching and grading style, the calssroom size, the class time (and similar variables that are only related to different section of the course). Factors four and six show the interactions among the student's math ability, his / her gener,and the instructor for the course. These interactions agree with Lipe's (1989) findings that interaction between instructor and gender affect the student's performance. Factor three is a combination of the interaction among all the sets of variables, excluding sex: math-related, instructors, and time. However, the coefficients for time varialbes are relatively high (-0.54 and +.062 for TIME 2 and TIME 3 respectively) which led to calling this factor a class meeting time factor.

In summary, the factor analysis reveals three distinct patterns: the students' mathematics abilities, the interaction among a student's mathematics knowledge, instructor, and gender, and finally the instructor effect (including calss meeting time effect). The results of this analysis suggest that the power of the test could be improved by including the interactive variables that have been suggested above.[٧]

Discriminant Analysis results

The results of the factor analysis imply that the students' mathematics abilities can substantially improve their performance in the first college-level accounting course. To evaluate whether the students' mathematics background can predict their passing the course (a "C" in the course is defined as passing), discriminant analysis was performed. Table VI shows the discriminant functions for those students who failed and those who passed the course.

TABLE VI

DISCRIMINANT ANALYSIS RESULTS

VARIABLES	Failing	Passing
CONSTANT	-21.84	-22.76
ARITH	+10.23	+ 7.34
ALGEB	+11.94	+10.91
HSMATH	+ 2.11	+ 2.19
HSALG	+24.79	+26.08
COLMATH	+ 2.45	+ 2.78
COLALG	- 2.10	- 1.50
COLCAL	+ 0.76	+ 0.74
SEX	- 0.18	+ 1.15

Notes:

1) Number of observation for the above analysis is 429.
2) Also see notes on Table III.

Using the discriminant functions, we predicted whether students had passed or failed the course. The results suggest that, given only the student's performance on a simple test at the beginning of the course and knowledge of previous mathematics background, one can predict the student's ability to pass the course with 73% accuracy. The degree of accuracy improves (to 78%) when the student's ACT score is included in the model.[A]

IV- Conclusions And Implactions

This study supports and extends previous research on the success of students in the first college-level accounting course, in that it examines a larger number of variables within the context of one study. In the past, studies have focused on only one or two variables at a time and also have not considered the instructor or calssmeeting time effect.

Consistent with the previous studies, this study also found that the student math ability affects performance. Having previously had algebra at some level (high school or colleg) proved to have an effect. However, it should be noted that it was the math ability itself as reflected in ARITH and ALGEB that was significant, not the number of courses; HSMATH and COLMATH were not significant.

Other studies have that the sex of the student was related to a difference in performance, but there was disagreement about the direction. This study supports those studies which suggest that females outperform males in the beginning accounting course. Also, there is some indication that the sex of the instructor may be related to a difference in the performance of students. However, there were too few instructors of either sex to make any conclusions about this potential variable.

There is, of course, an additional Instructor effect. We expected that good teachers (or ones with innovative teaching styles)would facilitate a good performance, while the oppsite would be ture for a teacher. This study supports the instrutor effect on the succes of the student when success is measured by the course letter grade; however when simply looking at whether the student passed or failed, the instructor effect was less significant. These results imply that, while the specific instructor has less effect on whether a student passes, that instructor will affect the particular grade within the passing context. However, it is possible that all that is being captured here is that some instructors have more rigid evaluation standards. Coupled with the indication that the sex of the instructor may affect student performance, we suggest that an extension of this study would be to conduct additional research on the instructor effect, when the same evaluation standards are used for all subjects.

In previous studies, little attention has been paid to interactive effects of the explanatory variables. In addition to the separate effets of math ability, sex, and the specific instructor on student performace, there is an interactive effect among these variables.

The results of this study support requiring adequate mathematics skills prior to enrollment in a college-level accounting course. This requirement may be filled in at least two ways: one, students could be required to have already taken their math courses; and two, a passing score on a simple test similar to the one in the Appendix could be used as an entry critertion. Such a requirement is especially important when and considers that those who do not perform well in lower-level accounting courses usually do not perform well upper-level accounting courses either.

Endnotes

1. The total number of students was 472; however, the missing data resulted in a reduction of the sample size to 429.

2. Previous research has already indicated that the ACT/SAT score has a high degree of explanatory power in students' grades (see Eskew and Faley, 1988). Since the results of prior studies are not conflicting, there is no necessity to reevaluate the effect of ACT scores in this study. However, as will be mentioned, ACT scores (for those students whose scores were available) do have explanatory power.

3. INST1 is female and the rest of instructors are males.

4. The following shows how the dependent variable is measured:
If the student fails the course or withdraws from it the dependent variable is "0."
If the student makes a "D" for the course the dependent variable is "1."
If the student makes a "C" for the course the dependent variable is "2."
If the student makes a "B" for the course the dependent variable is "3."
If the student makes an "A" for the course the dependent variable is "4."

5. After running all the regressions in Table III, we found that including ACT scores in the analysis will improve the power of test. For example, the adjusted R^2 for males in Panel B of Table III improved to 0.48. However, since two different samples (although one is a subsample of the other one) are used for the analysis, it is not appropriate to compare the R^2 of these regressions.

6. If the intercept is capturing the effect of the fifth instructor (not specifically defined in the regressions), then the results of Probit analysis show that the fifth instructor effect is also reduced in Panels B and C in Table IV.

7. The results of the Factor analysis did not materially change when ACT scores were introduced in the model. However, ACT scores were observed in factors one and three. Since the results are not substantially different and the number of observations is reduced (from 429 to 195) when ACT score is included in the model, the latter analysis is not shown here.

8. We were unable to find the same degree of accuracy to predict the students' actual grades ("A" to "F" and withdrawals). This inability is mainly related to the fact that

this study does not provide a high degree of explanation for the variability in the grades (notice R^2s in Table III, Panels A, B, and C). It can be expected that when other variables that are shown to be significantly related to student performance are included in the test, the results of the discriminant analysis will improve not only for failing and passing grades but also for the actual "A" to "F" grades.

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APPENDIX
Sample mathematics quiz

1. One-third of $9,900 is $_______________.
2. $2,500 is what percent of $10,000?_______________%
3. Express 1/12 as a percentage._______________%
4. Express 1/4% as a decimal._______________
5. ($10,000 - $1,000) x (4/15) = _____________.
6. If 2X - X = $27,000, what is X? $_____________.
7. Express 40% as a common fraction._____________.
8. 6X - $10,000 = 10X - $30,000. What amount is X? $___________.
9. Multiplying by 10% is equivalent to dividing by _____________.
10. $1,800 divided by 0.2 = $____________.
11. A company's total sales last year were $75,000, and the company expects this year's sales to be 5% higher than last year's. This year's sales should be $___________.
12. When Sean reviews his costs for textbooks, he notices that he has bought two texts at $40 each, two texts at $50 each, two texts at $60, and one text at $75. What is the weighted average cost per textbook?__________.
13. The number of females to males in the class is in a 4 to 3 ratio. There are 24 males. How many females are there?___________.
14. A company's total costs can be expressed as:

    Total Costs = $1.25X + $500.

    X is equal to the number of units produced and the $500 represents costs that will always be incurred, such as rent. If one more unit of X is produced, how much will total cost increase? $__________________.

15. If the employees of the company in question 14 go on strike, and no units of X are produced, how much will total costs be? $____________.
16. Suppose the company in question 14 sold each unit of X for $2.00. How many units would have to be sold for the company to break even?_____________.