Dear Workshop Participant,

Congratulations! You have just won the consolation prize in the Louisiana State Lottery's mega jackpot, an invitation to attend Ted's workshop on cooperative learning, as applied to developmental math; a tool for increasing student success and retention.

I would like to thank you in advance for inviting me to your campus to spend the afternoon sharing my enthusiasm and experiences with cooperative learning, especially in developmental math courses. I look forward to sharing our ideas, both yours and mine, on how to help our students succeed in math. I have two objectives for the workshop: first is my personal objective, to bring home at least one or two activities, ideas or approaches that I can use in my classes, based upon your input; second, to encourage (convince) you to try a few of the coop structures in your classes, as soon as you can see a way to fit them into your syllabus.

Attached is an agenda for the day's activities. I hope to be able to have us work through all the activities listed since the math will not be time consuming. One of the questions that arises about coop learning is what do I do with students who finish activities early and my answer is to be over prepared with extra worksheets that provide more problems for the day's topic. That was my strategy in preparing this agenda. We will be able to modify the agenda during the day if we find a consensus to do so. The second topic is very interesting. I have used this question as a basis for workshops at AMATYC and elsewhere with very positive results.

I have attached two additional items. A questionnaire that will form the basis for our first activity and help me get to learn about your innermost thoughts before we start the math related activities. The second item will be used for the second activity and asks you to list characteristics of your developmental math students. Please complete both before the workshop.

If you would like to contact me prior to the workshop please feel free to email me at tpanitz@capecod.net or call me at 508-428-4787. I would love to chat with you before the workshop to get a better idea of how I can tailor the day to meet your interests. I look forward to meeting you and working with you on this exciting topic.

Regards,

Ted

Cooperative learning contributes to student connections with the college and thus promotes retention and success in developmental courses

Agenda: (Q & A will be encouraged throughout the session, not just at the end)

1. Base group Introductions (pairs/quads/whole group)- **Please complete the form provided in this package.**
    a. How do you teach (describe what you do from the beginning to end of each class and before and after class if appropriate)?
    b. Why did you choose teaching as a career?
    c. How does your teaching approach/philosophy encourage student retention and success?

2. What are you developmental students like? (Round Robbin cooperative exercise) **Please complete the form provided in this package.**

3. Cooperative learning- math demonstrations-
    a. Pairs investigation of orders of operations
    b. Foil Factoring Jigsaw / Modified foil factoring jigsaw in pairs (5 things in common warm up exercise).
    c. Pair reading- course syllabus (mastery approach to assessment/testing)
    d. Review of other activities that lend themselves to cooperative learning.

4. How do you help your students make connections in your classes or with the institution?

5. Question and Answer session if appropriate.

Baton Rouge CC- Workshop –Participant Questionnaire

Here are some questions to ponder that we will use during the introduction phase of our workshop. Why did you choose teaching as a career? What is your philosophy of teaching/learning? How do you teach? How do you involve your students in the learning process? How does your teaching style/approach foster student retention? Please write out your responses prior to the workshop.

Do you use cooperative learning activities or structures in your classes? How?

What question(s) do you have about cooperative learning?

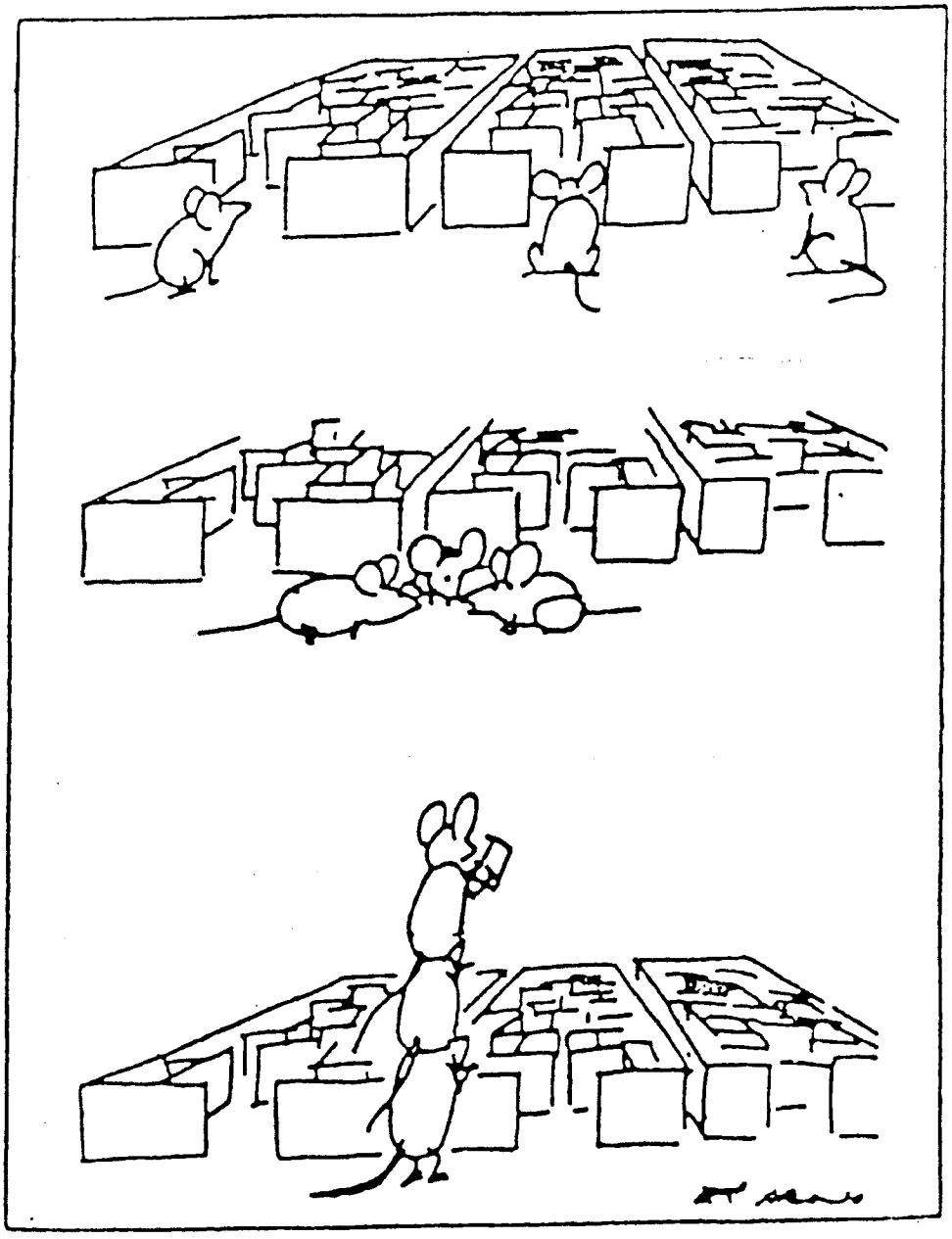
Please use the reverse side or extra sheets if you need more room to answer these questions.

What Are Your Developmental Math Students Like?

What prior learning experiences/math skills do they bring to college? How are their study skills when they arrive on campus? How motivated are they? What problems are they dealing with that may impact their success both on and off campus? How do they behave in and out of class? What other observations can you offer to help the group better understand the nature of your students. Use whatever format you wish- single word descriptors, phrases, sentences, etc.

Use the reverse side of the page if you have additional comments

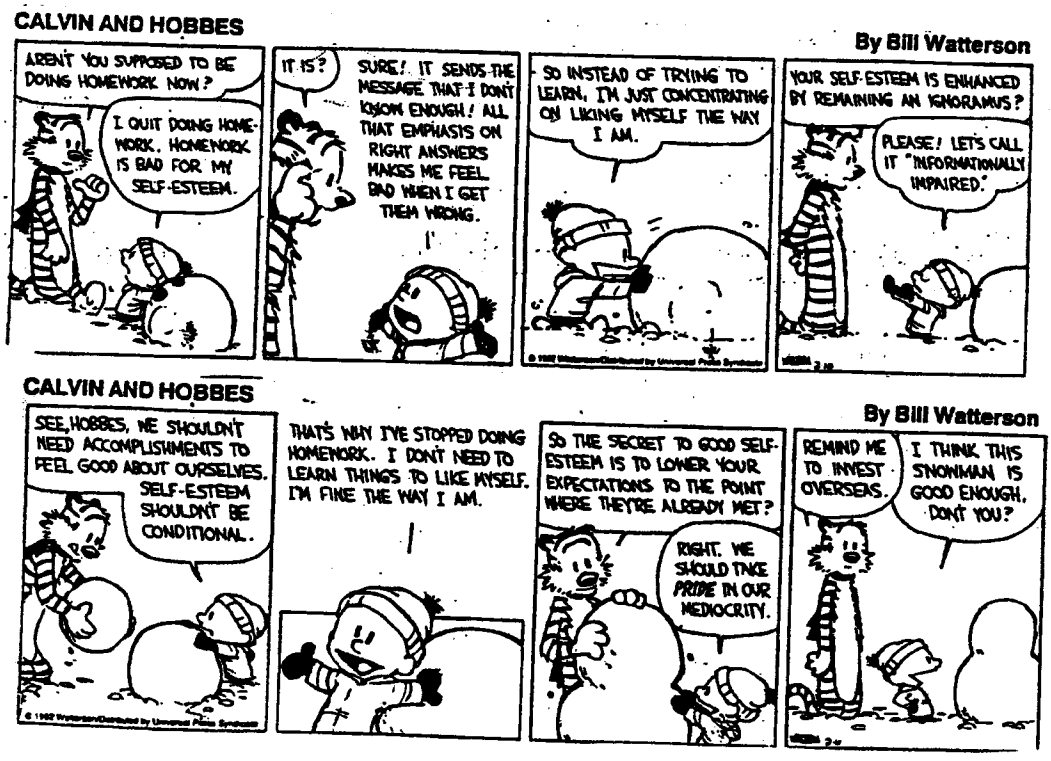
Co operative Learning



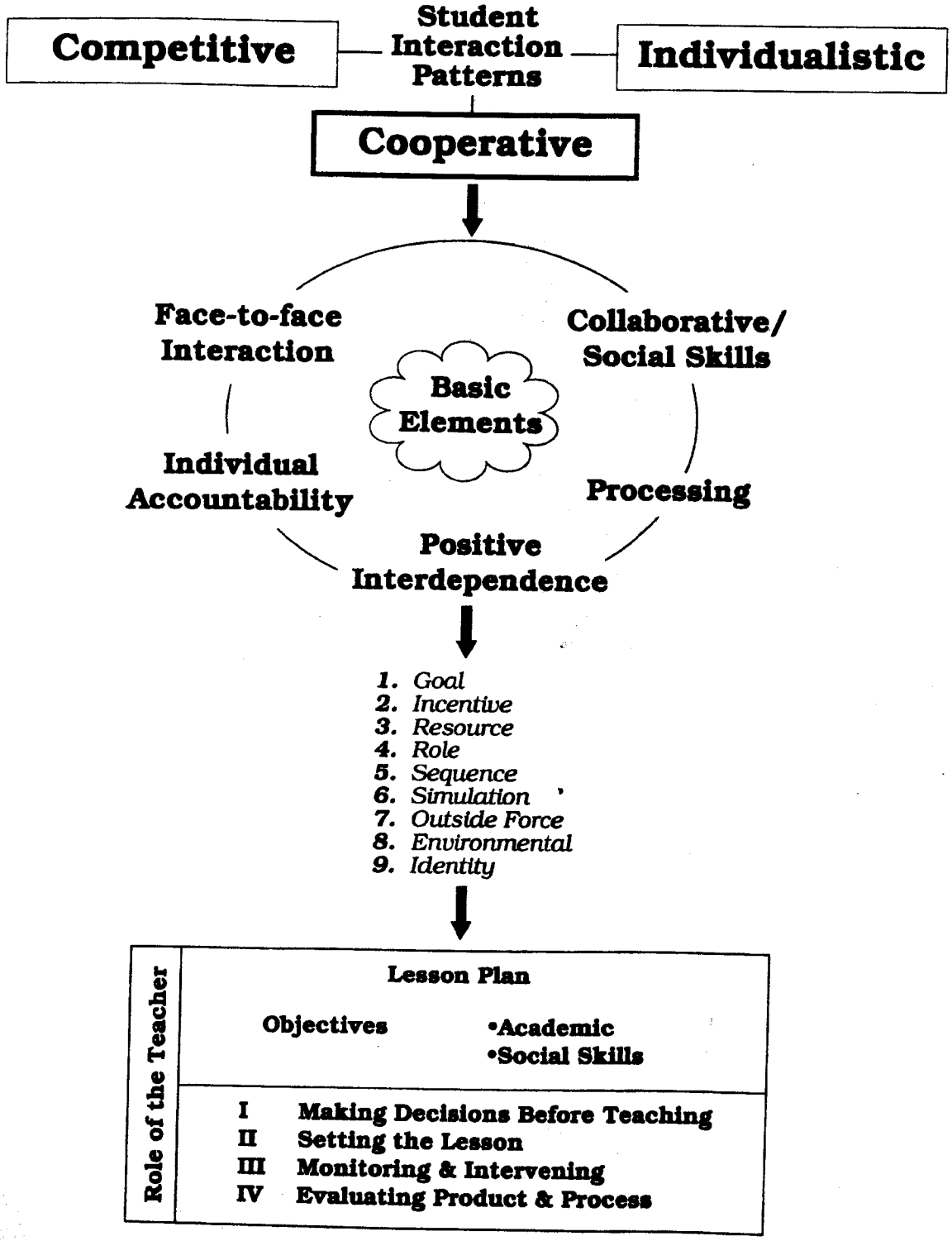
Students Retention

Studies have shown that students will retain:

- **10%** of what they **READ**
- **20%** of what they **HEAR**
- **30%** of what the **SEE**
- **50%** of what they **SEE & HEAR**
- **70%** of what they **SAY**
- **90%** of what they **SAY** as they **DO SOMETHING**
- **95%** of what they **TEACH** to **SOMEONE ELSE**



Cooperative Learning: An Overall Perspective



B. Bennett, C. Rolheiser, L. Stevahn (1991)
Cooperative Learning: Where Heart Meets Mind

Five Basic Elements of Cooperative Learning *

Facilitating effective small group learning means helping group members perceive the importance of working together and interacting in helpful ways. This can be accomplished by incorporating five basic elements into small group experiences. Ultimately, these elements become tools for solving problems associated with groupwork.

Positive Interdependence

When all members of a group feel connected to each other in the accomplishment of a common goal. All individuals must succeed for the group to succeed. (Refer to Chapter 6 for further information.)

Individual Accountability

Holding every member of the group responsible to demonstrate accomplishment of the learning. (Refer to Chapter 7 for further information.)

Face-to-face Interaction

When group members are close in proximity to each other and dialogue with each other in ways that promote continued progress.

Social Skills

Human interaction skills that enable groups to function effectively (e.g., taking turns, encouraging, listening, giving help, clarifying, checking understanding, probing). Such skills enhance communication, trust, leadership, decision-making, and conflict management. (Refer to Chapter 8 for further information.)

Processing

When group members assess their collaborative efforts and target improvements. (Refer to Chapter 9 for further information.)

* See: Johnson, D.W., Johnson, R.T., & Holubec, E.J. (1990). *Cooperation in the Classroom* (rev. ed.). Edina, MN: Interaction Book Company.

Ways to Structure Positive Interdependence *

1. Goal _____ Common purpose is established. One achieves if all achieve.

2. Incentive _____ All teammates receive the same reward if every teammate succeeds.

3. Resource _____ One set of shared materials per group.

4. Role _____ Each member is assigned a complementary and interconnected role.

5. Sequence _____ Overall task is divided into sub-units and usually performed in a set order.

6. Simulation _____ Teammates work through a hypothetical situation to succeed or survive.

7. Outside Force _____ Groups compete against an outside force.

8. Environmental _____ Group members are bound together by the physical environment.

9. Identity _____ Teammates establish a mutual identity through a group name, flag, motto, song, etc.

* See: Johnson, D.W., Johnson, R.T., & Holubec, E.J. (1990). *Cooperation in the Classroom* (rev. ed.). Edina, MN: Interaction Book Company.

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Administration Fax: (508) 362-3988

Dear Elementary Algebra Student,

Welcome to the semester and Elementary Algebra. I can't think of a better way to spend a semester, having fun with algebra. I would like to say hello and offer a few words of advice and encouragement before we meet.. The prerequisite for this course is MAT020- Prealgebra, an identifiable pulse, a temperature of 98.6F and permission from your psychiatrist to subject yourself to this course over the next 15 weeks.

I have a few suggestions that are intended to guarantee your success in this course. If you make a good effort there is no doubt in my mind that you will pass. I am batting 1000 so far. **(What does batting 1000 mean?)**

1. It is vitally, imperatively, critically important that you read the text BEFORE class and TRY TO DO as many exercises as is humanly possible!!

   The text is "Introductory/Intermediate Algebra" by Lial, Hornsby and McGinnis 3rd edition
   Custom made specifically for elementary algebra at 4C's
   The student solutions manual is also required. Please get both books before the first class so you can review the fractions and percents review chapter. This is material covered in MAT020

2. Get extra help immediately if you feel you need it. I am available for extra help 24 hours a day 7 days a week except Sundays from midnight to 6am. I need to sleep sometime. We will work in groups and I will try to arrange study groups outside of class. Tutors will be available also and the math lab is open many hours during the week on a walk in basis.

With all the help available you can't not pass.

3. Back to number 1. The most important thing for you to do is try as many problems before class as possible. That is correct! I am not delirious. But you say "How can I do the problems before they are explained to me??" That is the very essence of this course; to help you gain your math independence. **We will work together in class on the material of the day. By the time the class is over you will know what you are doing.**

You will need plenty of time for homework. If you have a job or family pressures you will need to schedule your hours to allow for blocks of time to study. Experience shows that you need at least 3 hours outside of class for each hour of class. Some people need lots more. I suggest you do about an hour at a time instead of trying to do all the work at once. When you are studying math you can only do so much before you need a break.

I am enclosing a copy of the schedule. Please review the fractions and percent chapter. This is material covered in Basic Math.

I am also enclosing a writing assignment for you to complete before the first class. Bring it with you to the first class. Your math autobiography will help me get to know you better. Please type it.

If you have any questions or concerns about doing algebra in the Fall please feel free to call me at school at 508- 362-2131 x4421. I have an answering machine at school so you can leave a message and I will return your call. You may e-mail me at school at tpanitz@capecod.edu or at home at tpanitz@capecod.net

One last word; if you are concerned about anything I have written here, relax!!!. There are many opportunities for extra help inside and outside of the class. **If you are willing to work hard I can guarantee you will pass this course.**

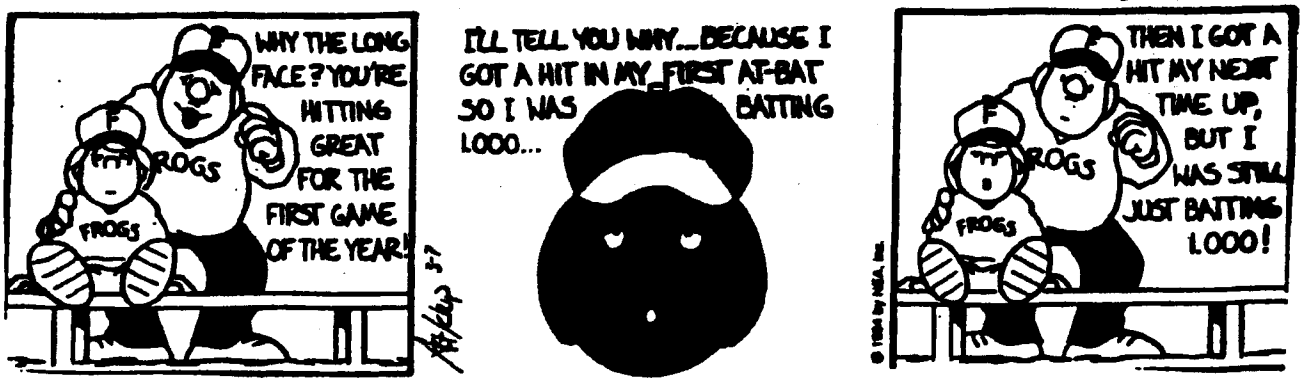
I look forward to meeting you and starting an exciting semester.

Sincerely yours

Ted

Ted Panitz

by Art Sansom



THE BORN LOSER

by Art Sansom

CHAPTER MODULE PREPARATION FORM chapter 1-1

This assignment is due back at the beginning of the next class. I will collect it and check it off during class.

CHAPTER EXPLANATION/SUMMARY

Describe in your own words the objective(s) of chapter 1.1. Explain what the chapter is teaching you.

VOCABULARY BUILDING

List and define in your own words some of the key words or phrases that will help you remember how to solve the chapter exercise problems. For example: "brackets", "symbols", "orders of operations"

Symbols:

CONCEPTS OR EXAMPLES THAT STILL NEED CLARIFICATION

In this section note any examples or written explanations in the section that you found confusing or that you could not follow the author's explanation. Specify example number and page (i.e. 3a on page 28) or write out the problem in the space below.

Name_____ **(over)**

WORK OUT THE FOLLOWING PROBLEMS IN ORDER TO PREPARE YOURSELF FOR THE CLASS Show all your steps if it takes several steps to complete the problem. These problems were taken from the chapter exercises. To check your answer find the problem number and check the answer in the back of the book.

Simplify each expression using the correct orders of operations.

1) $13+9\bullet5$

2) $9\bullet4-8\bullet3$

3) $18-2(3+4)$

4) $5\left[3+4\left(2^2\right)\right]$

5) $\dfrac{8+6\left(3^2-1\right)}{3\bullet2-2}$

6) $\dfrac{4(7+2)+8(8-3)}{6(4-2)-2^2}$

PLEASE WORK ADDITIONAL PROBLEMS PRIOR TO CLASS. The more you complete the better the class will be for you. Use extra paper if you need more room to work out the problems. Hand in this page plus any extra sheets you use to complete the above problems.

EXPLORING THE NEED FOR AN ORDER OF OPERATIONS

Determine two different ways to simplify each of the problems below.

1) $5+3\cdot 2$

possibility 1:

possibility 2:

2) $16\div 8\cdot 2$

possibility 1:

possibility 2:

What does the acronym PEMDAS stand for and how do we use it? Write your answer below.

There is a problem with using this acronym strictly. Can you think of what that problem is?

SIMPLIFY EACH EXPRESSION USING THE CORRECT ORDER OF OPERATIONS- PEMDAS

1) $3 \cdot 2 - 7 + 5$	**2)** $18 - 4 \cdot 2 + 3 \cdot 3$
3) $21 + 5 \cdot 4$	**4)** $6(3-1) - 2(5-2)$
5) $\frac{7+5}{6} + \frac{8+10}{9}$	**6)** $5(2) + 7(4) - 2(7)$

7) $16 \div 8 \cdot 4 + 36 \div 4 \cdot 2$	**8)** $15 - 3 \cdot 4 + 7$
9 $\frac{3(17-9)}{4} + \frac{9(16-7)}{3}$	**10)** $\frac{7 \cdot 8 + 4}{5 \cdot 8 - 10} + \frac{9 \cdot 6 - 4}{6 \cdot 5 - 20}$
11) $92 - 3[2(5-2)]$	**12)** $16 \div 2 \div 4 \div 2$

ORDERS OF OPERATIONS- SIMPLIFYING PARENTHESES

Simplify the following expression by having each person in your group (pair) do one step and then pass the paper to the next person. Do one operation, have everyone in the group check it to assure it is correct and then pass the paper to the next person in the group.

1) $10\,(6 - 5\,(8 - 4))$

2) $(9\,(7 - 3) + 13) - (11 - 2\,(6 + 9))$

3) $(6\,(y + 4) - 12) - (5\,(y - 8) + 11)$

MAT030-ELEMENTARY ALGEBRA
COURSE DESCRIPTION

INSTRUCTOR- Ted Panitz

OFFICE- 213 Science building PHONE- 362-2131 ext 4421 HOME 428-4787
E-MAIL tpanitz@capecod.edu
WEB PAGE: http://tpanitz.jimdo.com

WHAT TO EXPECT- The course is designed to use a mastery approach to study math with elementary algebra. Students qualify to enter this course by one of two ways. Either they have completed Basic Math MAT020 at 4C's or they have scored high enough on the computer placement test to qualify for MAT030. In either case a basic arithmetic background is presumed. This means that students should be familiar with the BASIC MATH materials covered in chapter R and parts of chapter 1 of the textbook. We will do a short review of this material to help bring everyone up to the same level prior to beginning MAT030, however it is recommended that each student review this material on their own.

The very mention of the word algebra often evokes anxiety in people. This course has been developed with those people in mind. While not exactly self paced, this course will attempt to accommodate the fact that not all students learn at the same rate. For those people who have completed MAT020 it is hoped that your anxiety level has been reduced and your confidence in learning algebra increased proportionally. One purpose of this course is to help you become independent math learners by encouraging you to do math in class with your peers through collaborative learning activities. After you complete this class you will be qualified and competent to take intermediate algebra or any course with an elementary algebra prerequisite.

METHOD OF GRADING- Students may receive a letter grade or a pass/fail grade at their discretion. There are five masteries and a final exam. In order to obtain a P grade you need a minimum of **80% on all masteries** and 70% on the final. The final is cumulative. After you complete a test I will check it for you and indicate any incorrect answers and then allow you to correct any mistakes immediately. If you get above an 80% on the corrected test I will continue to return the test until you complete all the problems correctly. If you do not reach an 80% mastery level after you have made corrections you will need to restudy the material, complete the chapter review section showing all your work and submit it to me before you take another mastery, following the same procedure as above. Makeup masteries will be done outside of class time. Past experience shows that students who work all the text problems for homework and participate in class and attend every class rarely need to do a mastery retake.

At the end of the semester you may be asked to retake the CPT assessment as a post test. The purpose of this is to assist the math department in building a data base with pre and post test information from students who complete our developmental courses. In the event we make changes to the courses we need this information to determine if the changes were effective. In order to encourage you to participate I offer the following final exam option. If you take the CPT and receive a raw score of 58, and you have passed all the chapter masteries, then you will exempt the in class final exam. The take home final is still required in any case. If you do not complete the course requirements but get a score above 58 you meet the equivalent prerequisite for follow up courses.

CLASS PROCEDURES- Class attendance is very important. In addition to the class being fun we will cover important concepts in a way that will make algebra interesting and understandable. In addition you will meet nice people and make lifelong friends. Class participation is encouraged. Attendance is taken in each class. We work problems in small groups and in pairs, on the board and on work sheets together. My main objective in this course is to encourage you to learn how to learn algebra. I do not insist however that everyone participate publicly, such as going to the board. I want you to be comfortable with the process, so you may decline an invitation to participate any time you feel uncomfortable in doing so.

This class does not meet graduation requirements for math nor does it count toward graduation credits. It does count for institutional credits needed for financial aid, health insurance or other institutional requirements.

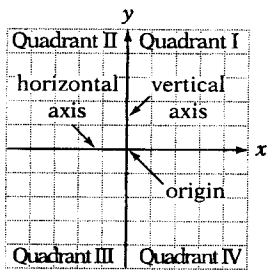
Objective A To graph points in a rectangular coordinate system.....

POINT OF INTEREST

A rectangular coordinate system is also called a Cartesian coordinate system in honor of Descartes.

Before the 15th century, geometry and algebra were considered separate branches of mathematics. That all changed when René Descartes, a French mathematician who lived from 1596 to 1650, developed **analytic geometry**. In this geometry, a *coordinate system* is used to study relationships between variables.

A **rectangular coordinate system** is formed by two number lines, one horizontal and one vertical, that intersect at the zero point of each line. The point of intersection is called the **origin**. The two lines are called **coordinate axes**, or simply **axes**. Generally, the horizontal axis is labeled the x-axis and the vertical axis is labeled the y-axis.

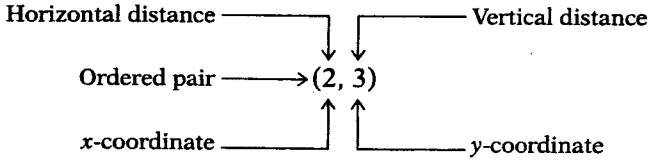


The axes determine a **plane**, which can be thought of as a large, flat sheet of paper. The two axes divide the plane into four regions called **quadrants**, which are numbered counterclockwise from I to IV starting from the upper right.

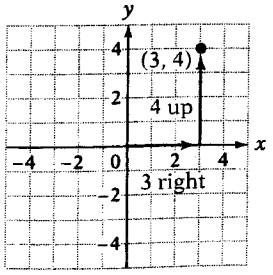
POINT OF INTEREST

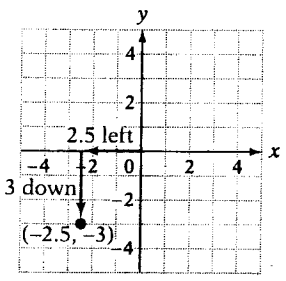
Gottfried Leibnitz introduced the words *abscissa* and *ordinate*. *Abscissa* is from a Latin word meaning "to cut off." Originally, Leibnitz used *abscissa linea*, "cut off a line" (rule). The root of *ordinate* is also a Latin word used to suggest the sense of order.

Each point in the plane can be identified by a pair of numbers called an **ordered pair**. The first number of the ordered pair measures a horizontal distance and is called the **abscissa**, or ***x*-coordinate**. The second number of the pair measures a vertical distance and is called the **ordinate**, or ***y*-coordinate**. The ordered pair (x, y) associated with a point is also called the **coordinates** of the point.



To **graph** or **plot** a point in the plane, place a dot at the location given by the ordered pair. The **graph of an ordered pair** is the dot drawn at the coordinates of the point in the plane. The points whose coordinates are (3, 4) and (−2.5, −3) are graphed in the figures below.





Objective B To determine ordered-pair solutions of an equation in two variables

A coordinate system is used to study the relationship between two variables. Frequently this relationship is given by an equation. Examples of equations in two variables include

$$y = 2x - 3 \qquad 3x + 2y = 6 \qquad x^2 - y = 0$$

A **solution of an equation in two variables** is an ordered pair (x, y) whose coordinates make the equation a true statement.

TAKE NOTE

An ordered pair is of the form (x, y). For the ordered pair $(-3, 7)$, -3 is the x value and 7 is the y value. Substitute -3 for x and 7 for y.

➡ Is the ordered pair $(-3, 7)$ a solution of the equation $y = -2x + 1$?

$$\begin{array}{r|l} y = -2x + 1 & \\ \hline 7 & -2(-3) + 1 \\ 7 & 6 + 1 \\ 7 = 7 & \end{array}$$

- **Replace x by -3 and y by 7.**
- **Simplify.**
- **Compare the results. If the resulting equation is a true statement, the ordered pair is a solution of the equation. If it is not a true statement, the ordered pair is not a solution of the equation.**

Yes, the ordered pair $(-3, 7)$ is a solution of the equation.

Besides $(-3, 7)$, there are many other ordered-pair solutions of $y = -2x + 1$. For example, $(0, 1)$, $\left(-\frac{3}{2}, 4\right)$, and $(4, -7)$ are also solutions. In general, an equation in two variables has an infinite number of solutions. By choosing any value of x and substituting that value into the equation, we can calculate a corresponding value of y.

➡ Find the ordered-pair solution of $y = \frac{2}{3}x - 3$ that corresponds to $x = 6$.

$$\begin{aligned} y &= \frac{2}{3}x - 3 \\ &= \frac{2}{3}(6) - 3 \qquad \text{• Replace } x \text{ by 6.} \\ &= 4 - 3 \qquad \text{• Solve for } y. \\ &= 1 \end{aligned}$$

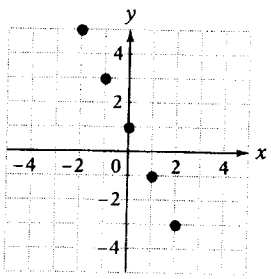
The ordered-pair solution is $(6, 1)$.

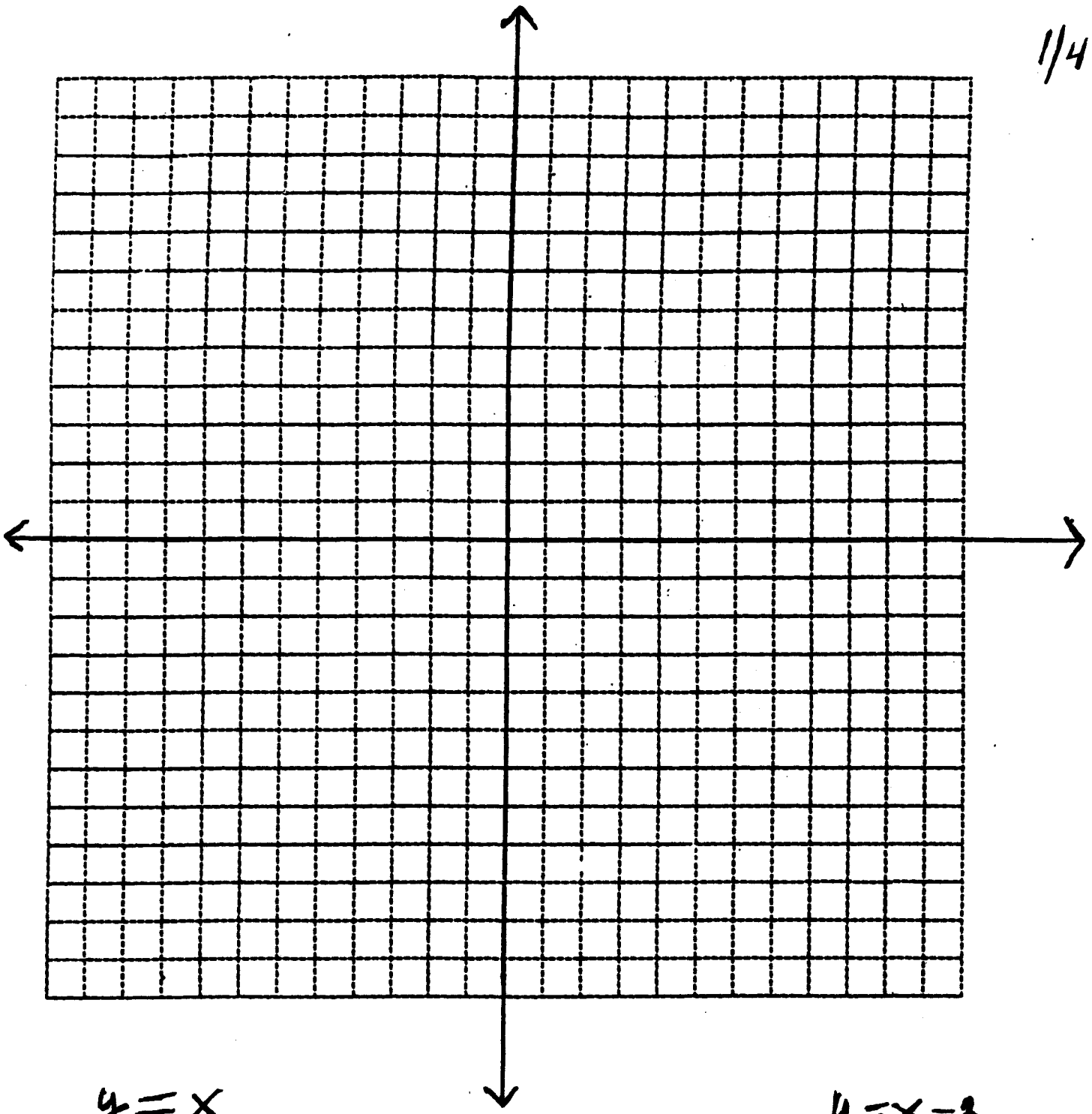
The solution of an equation in two variables can be graphed in an xy-coordinate system.

➡ Graph the ordered-pair solutions of $y = -2x + 1$ when $x = -2, -1, 0, 1$, and 2.

Use the values of x to determine ordered-pair solutions of the equation. It is convenient to record these in a table.

x	$y = -2x + 1$	y	(x, y)
-2	$-2(-2) + 1$	5	$(-2, 5)$
-1	$-2(-1) + 1$	3	$(-1, 3)$
0	$-2(0) + 1$	1	$(0, 1)$
1	$-2(1) + 1$	-1	$(1, -1)$
2	$-2(2) + 1$	-3	$(2, -3)$





$y = x$

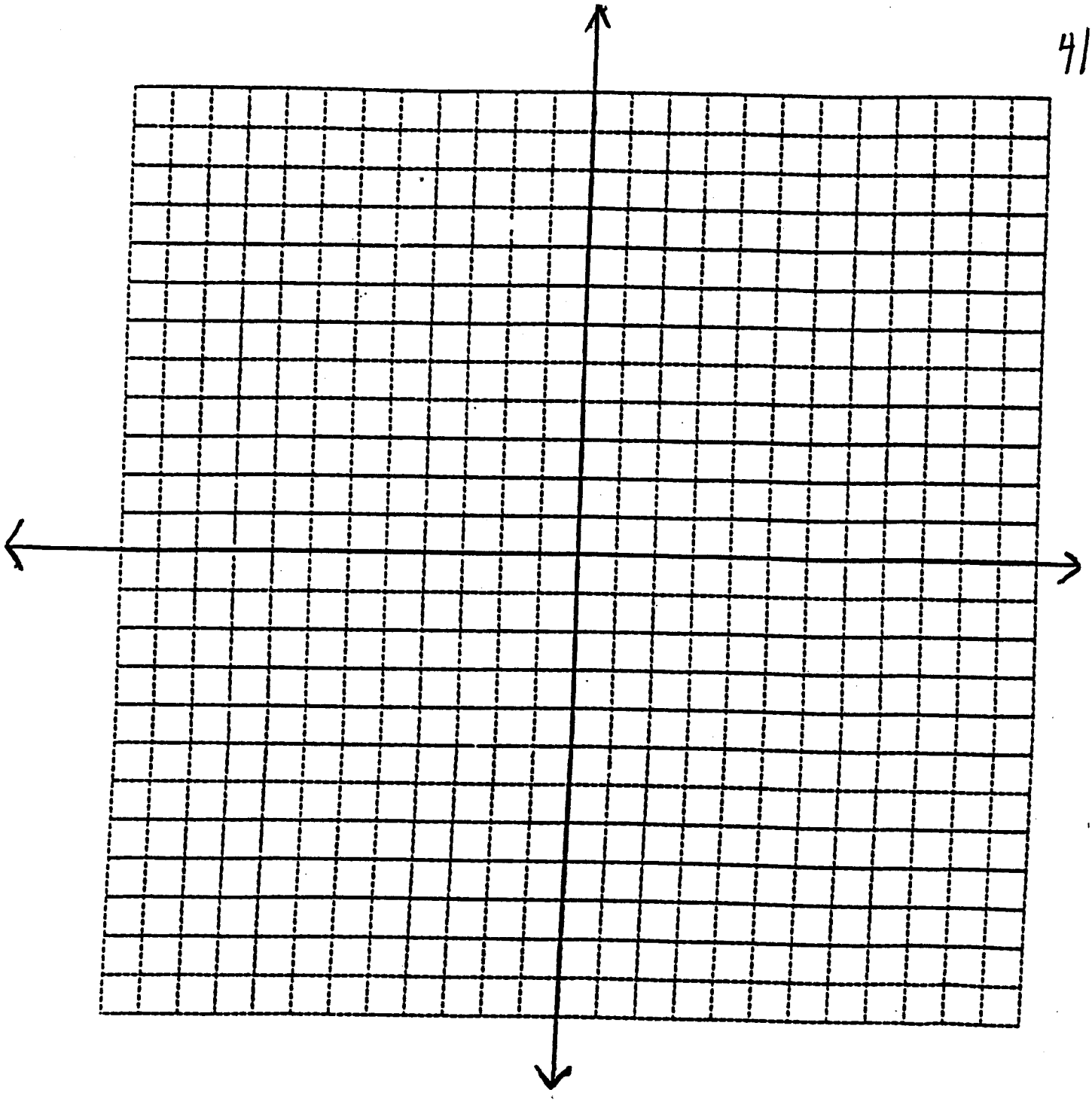
x	y
-1	
-2	
0	
1	
2	

$y = x + 2$

x	y
-1	
-2	
0	
1	
2	

$y = x - 2$

x	y
-1	
-2	
0	
1	
2	



Graph Each equation using the data table provided. You chose the x value + calculate

$y = 2x - 1$

x	y	(x, y)

$y = -3x + 4$

x	y	(x, y)

$y = \frac{3}{2}x - 2$

x	y	(x, y)

Let us begin our study of models with the discussion of an example that can be represented by a straight line and its corresponding linear equation.

EXAMPLE 2.3

You plan to rent a truck in Canada. The local *Trucks-R-Us* rental company charges \$39 (U.S. dollars) per day plus 16¢ per kilometer. Set up a linear model that will describe a one-day rental both algebraically and geometrically. What would be the cost of renting the truck if you expected to drive 100 kilometers? How many kilometers could you drive if you wanted to keep your total costs under \$200?

SOLUTION: Since we want to explore a number of different options, we would like our model to express a relationship between kilometers traveled and the total cost of the rental. Using an algebraic approach, let C = total rental cost and K = kilometers traveled. In every case, total cost is computed by adding to the fixed rental fee of \$39 an additional 16¢ for each kilometer traveled. This leads to the equation, or model,

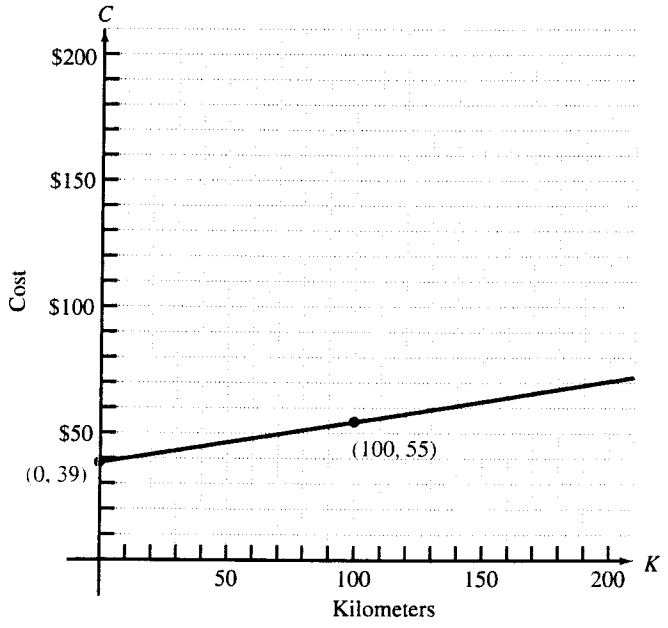
$$C = \$39 + (\$0.16/\text{kilometer}) \cdot (K \text{ kilometers})$$

or, leaving out the units,

$$C = 39 + 0.16K$$

The corresponding graph of this equation is found by plotting points or using the fact that the *C-intercept* is (0, 39) and the slope is 0.16, as shown in Figure 2.10.

Figure 2.10



To find the total cost to drive 100 kilometers, we could *estimate* the value from the graph. The exact solution can be found by substituting 100 kilometers for K (notice from our work with unit analysis that the units simplify correctly):

$$C = \$39 + (\$0.16/\text{kilometer})\,(100 \text{ kilometers}) = \$55$$

To find the number of kilometers you could travel if \$200 were available, again we could estimate the value from the graph or substitute \$200 for C:

$$\$200 = \$39 + (\$0.16/\text{kilometer})\,(K \text{ kilometers})$$

Solving this equation for K gives (again, observe the units),

$$K = 1{,}006.25 \text{ kilometers}$$

Since we would expect the rental company to charge the full 16¢ for the .25 portion of a kilometer, we should note that $K = 1{,}006$ kilometers would achieve our goal of keeping the total cost for the rental *under* \$200. That is,

$C = \$39 + (\$0.16/\text{kilometer})\,(1{,}006 \text{ kilometers}) = \$199.96$

while,

$C = \$39 + (\$0.16/\text{kilometer})\,(1{,}007 \text{ kilometers}) = \$200.12$ (over the \$200 limit)

■

The solution to the last example brings up a number of points about this particular model. Is it realistic that you would be able to drive over 1,000 kilometers in one day? What if it took you two days to make the trip? Then the model would no longer give an accurate result since this model assumes one day of travel. We will explore these limitations in the exercises.

Example 2.3 developed both an equation and a graph that described the relationship between kilometers traveled and total cost. The steps in determining this mathematical model are summarized in Table 2.1. In essence, the table is a **model of developing a model.**

A Model for Developing a Mathematical Model

1. Choose data that appear to be related.
2. Set up a coordinate system, label axes, and choose appropriate scales.
3. Plot the data points as ordered pairs on the coordinate system.
4. Sketch a **curve** that passes through the points.
5. Determine the equation of the curve.
6. Use the **curve** *and* the equation to predict other outcomes.
7. Consider the reasonableness of your results.
8. Consider any limitations of the model.
9. Consider the appropriateness of the scales.

In practice, the process of developing a model to represent a complex relationship may be very difficult. However, if the data are *linear* the problem is much simpler.

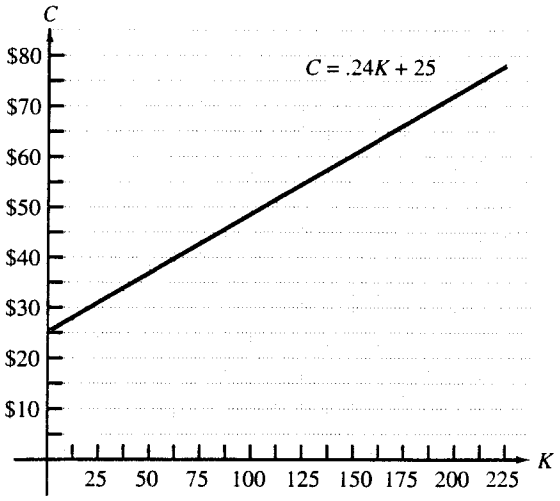
EXAMPLE 2.4 Still planning your move, you call Moving-Mania to see if you can get a better deal. They charge $25 per day plus 24¢ per kilometer. Which company offers a better deal?

SOLUTION: Proceeding in a similar manner to the last example gives the equation

$$C = \$25 + (\$0.24/\text{kilometer})\,(K \text{ kilometers})$$

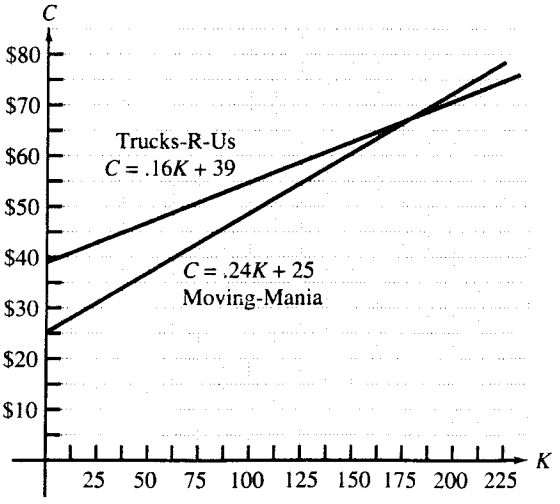
with the corresponding graph shown in Figure 2.11:

Figure 2.11



By drawing the graphs for the two options on the same coordinate system, we see that the lines cross. At the point where the lines cross, the value of C (total cost) and K (mileage) are the same for both models (Figure 2.12).

Figure 2.12



Though it is difficult to determine precisely where the graphs cross, we might *estimate* the coordinate representing miles traveled of that point to be

about 170 kilometers, with a corresponding cost of about $70. To find the precise point at which they cross, we observe that since the costs are equal at the point in question, the two equations for cost must be equal. This time we will write down the equations without the units, though it must be understood that they are still part of the answer. Setting the equations equal to each other, we have

$$39 + .16K = 25 + .24K$$

Grouping together all terms involving K on one side of the equation gives

$$.08K = 14$$

and, upon dividing both sides by .08,

$$K = 175 \text{ kilometers}$$

Using *either* equation we find the cost to be $67. Notice that both numbers are close to our estimates. Hence, if our trip will cover 175 kilometers, neither company will charge more. This is the **break-even point.** Comparing the graphs, if our mileage is *less* than 175 kilometers, Moving-Mania offers a better deal, since the height of the graph (which represents total cost) is lower than the graph for Trucks-R-Us. If we travel *more* than 175 kilometers, just the reverse is true.

My Very Own Property Definitions

Write out each definition of the specified property in your own words. Try to write each definition in a way that will help you remember the property. Use your imagination! Poetry, hyku, thesaurus wording, stories, anything that will help you remember what is unique about the property and how to apply it. Use the reverse side of the paper if you need more room or use additional paper if you decide to write a novel.

Associative _____

Distributive _____

Commutative _____

Identity property for multiplication _____

Identity property for addition _____

Inverse property for addition _____

Inverse property for multiplication _____

Did we leave anything out which needs a definition??

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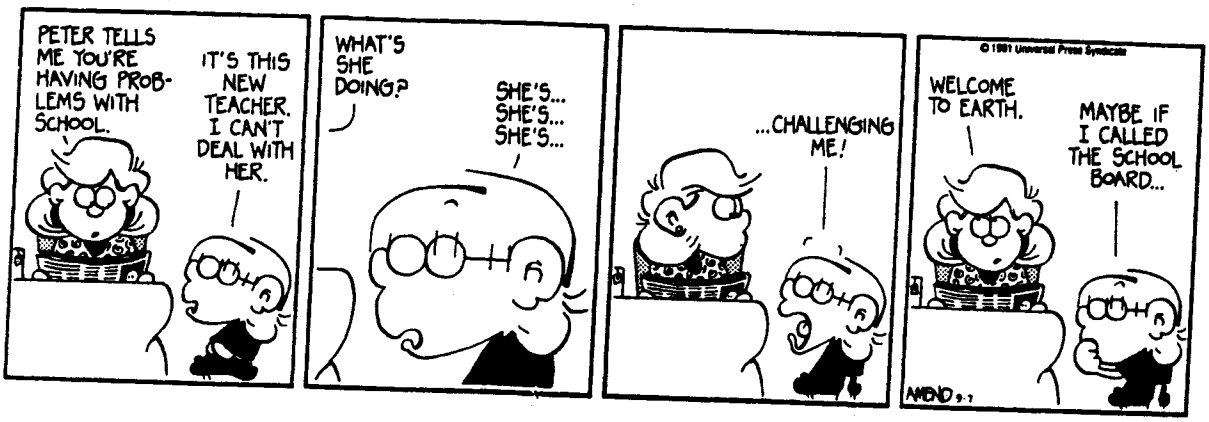
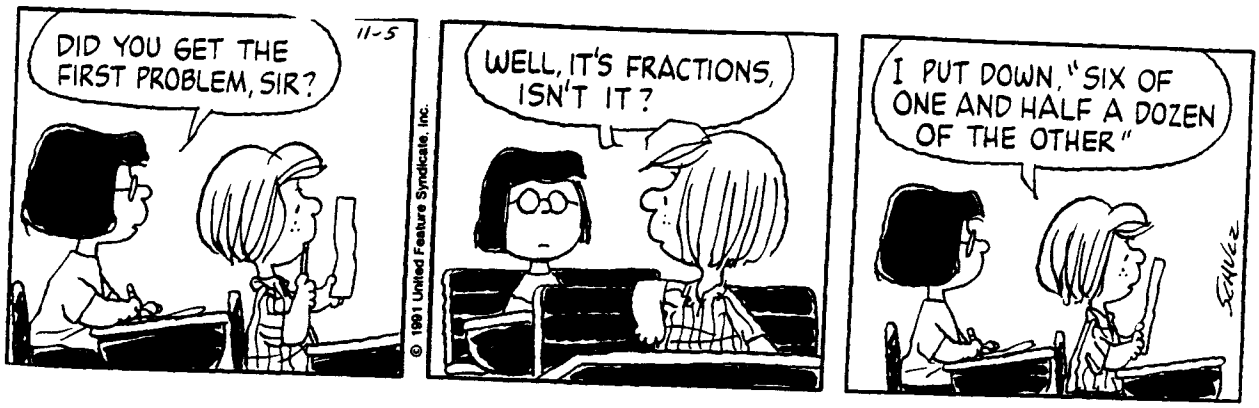


PEANUTS



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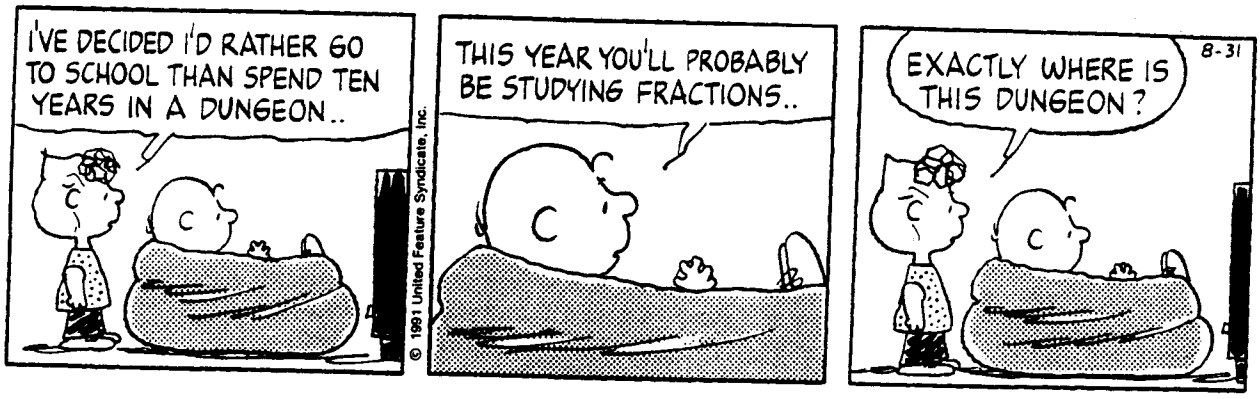


PEANUTS

ORDER OF OPERATIONS AGREEMENT
STUDY GUIDE

Name _____

In this assignment you will develop a study guide that may be used by your new math buddies and yourself to better understand the idea behind the order of operations agreement.

Write out your own definition <u>in your own words</u> and give several examples that will help someone else understand what is meant by an orders of operation agreement. Use your imagination and have some fun with your definition. Why do we need such an agreement?

Please print of type your guide as we will be sharing our guides during the next class. Use both sides of the paper if needed

Written explanation

EXAMPLES:

(over)

POST TEST REFLECTION

NAME_____

What mistakes did you make and why?

As a study guide and helpful procedure for preparing for future tests I have prepared a personal review process to help you analyze your mistakes on this test. The intent of this exercise is to help you avoid making similar mistakes later.

In the left hand column write the problem you did incorrectly when you first did the test. In the right hand column write your explanation about why you think you made the original mistake. Then explain how you decided to make your correction(s).

Some reasons for getting a problem incorrect on the first attempt may include:

- **A simple math mistake**
- **Did not remember a formula or procedure**
- **Did not remember a property or rule**
- **Did not use a rule or property correctly**
- **Was not familiar with the problem at all**
- **Transposed numbers during the problem solution or wrote the problem wrong**
- **Any other reason that comes to your mind.**

Question Answered Incorrectly	Reason why you made the mistake

Use additional paper if you need more room.

WHAT ARE EFFECTIVE GROUPS LIKE

SOUNDS LIKE	LOOKS LIKE

JIG SAW EXERCISE

There are two different and distinct methods for creating an equation of a line when you are given two points from that line.

In this exercise you will find another person in the room who has the same assignment or jigsaw part number.

You will then work together to become experts in your method. To do this you will complete the given problems and then outline in writing your process or strategy.

Next you will return to your original partner and teach that person your method.

Jigsaw part 1-- using the formula $y = mx + b$ create an equation of a line which contains the following points:

1) (5, 2) and (3, 1)

2) (-4, -2) and (6, 3)

Use the reverse side to write out your explanation. This will help your partner understand your method better. Yes it will!!!!!

JIG SAW EXERCISE

There are two different and distinct methods for creating an equation of a line when you are given two points from that line.

In this exercise you will find another person in the room who has the same assignment or jigsaw part number.

You will then work together to become experts in your method. To do this you will complete the given problems and then outline in writing your process or strategy.

Next you will return to your original partner and teach that person your method.

Jigsaw part 2-- using the formula y - y1 = m(x - x1) create an equation of a line which contains the following points:

1) (5, 2) and (3, 1)

3) (-4, -2) and (6, 3)

Use the reverse side to write out your explanation. This will help your partner understand your method better. Yes it will!!!!!

Factoring Jigsaw - Group Exercise

There are four parts to the factoring jigsaw. Each part represents a different case for factoring simple quadratic expressions ($aX + bX + c$). A simple quadratic expression has the coefficient of the first term (a) equal to 1.

This exercise will require groups of 4 people who will serve as a base group. Each person in the base group will be given a different case of simple factoring to work on and become an expert on that case. You will not be alone in your quest to become an expert in your case. You will work with other people who have the same case, so you will need to form new temporary groups according to your case number. Then follow the directions below.

Case #1- The coefficients of the second and third terms in the quadratic expression (b and c) are positive.
Procedure:

1. Factor each quadratic expression. If you need help confer with your group members or the textbook.
2. Determine the pattern of signs and numbers in the original expression and also in the factored form representative of this case.
3. Develop a strategy, with your fellow experts, to help you to explain how to factor your expressions to your base group.
4. Make up 5 problems of your own that you will ask your base group members to solve after you have explained what is unique about your case.

1) $X^2 + 10X + 21$ _____

2) $Y^2 + 14Y + 45$ _____

3) $A^2 + 15A + 44$ _____

4) $T^2 + 12T + 36$ _____

5) $X^2 + 24X + 144$ _____

Make up 5 problems to take back for your base group to solve after you have provided them with your expert teaching presentation

	Original quadratic	factored quadratic
1)	_____	_____
2)	_____	_____
3)	_____	_____
4)	_____	_____
5)	_____	_____

Factoring Jigsaw - Group Exercise

There are four parts to the factoring jigsaw. Each part represents a different case for factoring simple quadratic expressions ($aX + bX + c$). A simple quadratic expression has the coefficient of the first term (a) equal to 1.

This exercise will require groups of 4 people who will serve as a base group. Each person in the base group will be given a different case of simple factoring to work on and become an expert on that case. You will not be alone in your quest to become an expert in your case. You will work with other people who have the same case, so you will need to form new temporary groups according to your case number. Then follow the directions below.

Case #2- The coefficient of the second term is positive and the third term is negative in the quadratic expression (b is positive and c is negative)

Procedure:

1. Factor each quadratic expression. If you need help confer with your group members or the textbook.
2. Determine the pattern of signs and numbers in the original expression and also in the factored form representative of this case.
3. Develop a strategy, with your fellow experts, to help you to explain how to factor your expressions to your base group.
4. Make up 5 problems of your own that you will ask your base group members to solve after you have explained what is unique about your case.

1) $X^2 + 5X - 14$ _____

2) $Y^2 + 4Y - 32$ _____

3) $A^2 + A - 42$ _____

4) $T^2 + 5T - 36$ _____

5) $X^2 + 9X - 52$ _____

Make up 5 problems to take back for your base group to solve after you have provided them with your expert teaching presentation

	Original quadratic	factored quadratic
1)	_____	_____
2)	_____	_____
3)	_____	_____
4)	_____	_____
5)	_____	_____

Factoring Jigsaw - Group Exercise

There are four parts to the factoring jigsaw. Each part represents a different case for factoring simple quadratic expressions ($aX + bX + c$). A simple quadratic expression has the coefficient of the first term (a) equal to 1.

This exercise will require groups of 4 people who will serve as a base group. Each person in the base group will be given a different case of simple factoring to work on and become an expert on that case. You will not be alone in your quest to become an expert in your case. You will work with other people who have the same case, so you will need to form new temporary groups according to your case number. Then follow the directions below.

Case #3- The coefficients of the second and third terms in the quadratic expression (b and c) are negative.
Procedure:

1. Factor each quadratic expression. If you need help confer with your group members or the textbook.
2. Determine the pattern of signs and numbers in the original expression and also in the factored form representative of this case.
3. Develop a strategy, with your fellow experts, that will help you to explain how to factor your expressions to your base group.
4. Make up 5 problems of your own that you will ask your base group members to solve after you have explained what is unique about your case.

1) $X^2 - 4X - 45$ _____

2) $Y^2 - 5Y - 14$ _____

3) $A^2 - 7A - 44$ _____

4) $T^2 - 5T - 36$ _____

5) $X^2 - 4X - 21$ _____

Make up 5 problems to take back for your base group to solve after you have provided them with your expert teaching presentation

	Original quadratic	factored quadratic
1)	_____	_____
2)	_____	_____
3)	_____	_____
4)	_____	_____
5)	_____	_____

Factoring Jigsaw - Group Exercise

There are four parts to the factoring jigsaw. Each part represents a different case for factoring simple quadratic expressions ($aX + bX + c$). A simple quadratic expression has the coefficient of the first term (a) equal to 1.

This exercise will require groups of 4 people who will serve as a base group. Each person in the base group will be given a different case of simple factoring to work on and become an expert on that case. You will not be alone in your quest to become an expert in your case. You will work with other people who have the same case, so you will need to form new temporary groups according to your case number. Then follow the directions below.

Case #4- The coefficient of the second term is negative and the third term is positive in the quadratic expression (b is negative and c is positive)

Procedure:

1. Factor each quadratic expression. If you need help confer with your group members or the textbook.
2. Determine the pattern of signs and numbers in the original expression and also in the factored form representative of this case.
3. Develop a strategy, with your fellow experts, that will help you to explain how to factor your expressions to your base group.
4. Make up 5 problems of your own that you will ask your base group members to solve after you have explained what is unique about your case.

1) $X^2 - 10X + 21$ _____

2) $Y^2 - 14Y + 45$ _____

5) $A^2 - 15A + 44$ _____

6) $T^2 - 12T + 36$ _____

5) $X^2 - 24X + 144$ _____

Make up 5 problems to take back for your base group to solve after you have provided them with your expert teaching presentation

	Original quadratic	factored quadratic
1)	_____	_____
2)	_____	_____
3)	_____	_____
4)	_____	_____
5)	_____	_____

Factoring Jigsaw - complex quadratic expressions $ax^2 + bx + x$ (a is not equal to 1)

In this exercise you will work in pairs to become experts on either 1) the grouping method or 2) the trial and error method for factoring complex quadratic expressions

Factoring complex quadratic expressions using the trial and error or foil method
Factor each expression below using the trial and error method in order to help yourself become an expert in this procedure. Work with your partner to develop an explanation that you will use to explain this procedure to the other members of your group. They are working on the "grouping method" and will explain that method to you after they become experts in that technique.

1) $2Y^2 + 7Y + 3$

2) $5Y^2 - 22Y + 8$

3) $6B^2 - 17B + 15$

Work with your partner to develop a strategy for explaining the trial and error (foil) approach to factoring. Then teach your other partners this factoring technique.

Factoring Jigsaw - complex quadratic expressions $ax^2 + bx + x$ (a is not equal to 1)

In this exercise you will work in pairs to become experts on either 1) the grouping method or 2) the trial and error method for factoring complex quadratic expressions

Factoring complex quadratic expressions using the "grouping" method
Factor each expression below using the grouping method in order to help yourself become an expert in this procedure. Work with your partner to develop an explanation that you will use to explain this procedure to the other members of your group. They are working on the "trial and error method" and will explain that method to you after they become experts in that technique.

4) $2Y^2 + 7Y + 3$

5) $5Y^2 - 22Y + 8$

6) $6B^2 - 17B + 15$

Work with your partner to develop a strategy for explaining the grouping approach to factoring. Then teach your other partners this factoring technique.

DEVELOPING A PROCEDURE FOR FACTORING USING THE GROUPING METHOD

(If you use the trial and error method you may not pass go and you may not collect $200)

Work out the problem in the left column and write out each step in the left column as you proceed

Polynomial to be factored	Factoring by grouping procedure
1) $6W^2 + 19W + 10$	1) _____ 2) _____ _____ 3) _____ _____ 4) _____ _____
2) $10X^2 + 11X = 6$	1) _____ 2) _____ _____ 3) _____ _____ 4) _____ _____
3) $8m^2 - 10m - 3$	
4) $3x^2 + 16x + 16$	

Worksheet 4- chapter 6
Comparing multiplying and factoring methods

MULTIPLY OR FACTOR EACH COLUMN. CAN YOU SEE ANY PATTERNS BETWEEN THE TWO OPERATIONS?

Multiply this column	factor this column
4(3A –5B + 6C)	12A-20B+24C
$7(2X^2 - 5X - 4)$	$X^2 - 35X - 28$
$4Y^3(5Y - 6)$	$20Y^4$-$24Y^3$
$3X^4(4X^2 - 7X - 8)$	$12\,X^6$-$21X^5 - 24X^4$
$-4T(7T^3 + 4T^2 - 4T + 1)$	$-28T^4 - 16T^3 + 16T^2 - 4T$
$3X^2Y^5(2XY^3 - 4X^3Y^2 - 1)$	$6X^3Y^8$ –$12X^5Y^8$-$3X^2Y^5$
7(3A +5B-4C)	$21A + 35B - 28C$
$3(3X^3 - 4X^2 - 10)$	$9X^3 - 12X^2 - 30$
$2T^2(T^3 - 4)$	$2T^5 + 8T^2$
$5Y^2(Y^5 - 4Y^2 - 3)$	$5Y^7 - 20Y^4 - 15Y^2$
$4X(2X^3 - X^2 + 3X - 1)$	$8X^4 - 4X^3 + 12X^2 - 4X$
$6X^2Y^2(Y^2 - 6X^2 + 1)$	$6X^2Y^4 - 18X^4Y^2 + 6X^2Y^2$
$4B^3(6B^3 - 8B^2 - 3B + 2)$	$24B^6 - 32B^5 - 12B^4 + 8B^3$
$-5S^3T^3(4S - 3ST + 4T)$	$-20S^4T^3 - 15S^4T^4 - 20S^3T^4$
$7X(2X^2 + X - 3)$	$14X^3 + 7X^2 - 21X$
$8XY(X^3Y^6 - 2X^2 - 3Y)$	$8X^4Y^7 - 16X^3Y - 24XY^2$
$7(3A + 5B - 7C + 8E + 4F)$	21A+35B-49C+56E+28F
$3Y^5(2Y^5 - 3Y^4 - 5Y^3 + 3Y^2 - 7Y - 6)$	$6Y^{10} - 9Y^9 - 15Y^8$+$9Y^7 - 21Y^6 - 18Y^5$
$8A(2A^6 - 3A^5 - 5A^4 + A^3 - 4A^2$	$16A^7 - 24A^6 - 40A^5 + 8A^4 - 32A^3$
$9(2X^4 + 9X^3 - 3X^2 - 4X - 5)$	$18X^4 + 81X^3 - 27X^2 - 36X - 45$

Use the smallest exponent on any variable to factor the common variable.
You must factor completely!!!
If there is a variable left in every term after you think you are finished then you have not factored completely.

Multiplying conjugates or factoring difference of squares

Complete the table. Use separate paper if you need to. What patterns do you see?

Multiply this column	factor this column
(x + 3)(x – 3)	$x^2 - 9$
(y + 2)(Y – 2)	$y^2 - 4$
(a – 6)(a + 6)	$a^2 - 36$
(z – 10)(z + 10)	$z^2 - 100$
(2x – 5)(2x + 5)	$4x^2 - 25$
(3T +8)(3T – 8)	$9T^2 - 64$
(T + 4)(T – 4)	$T^2 - 16$
(x + 2)(x – 2)	$x^2 - 4$
(p – 5)(p + 5)	$p^2 - 25$
(y – 9)(y + 9)	$y^2 - 81$
(5c + 1)(5c – 1)	$25c^2 - 1$
(6d – 5)(6d + 5)	$36d^2 - 25$
(4m +n)(4m – n)	$16m^2 - n^2$
(7w –10y)(7w + 10y)	$49w^2 - 100y^2$
(10x - 9y)(10x + 9y)	$100x^2 - 81y^2$
(4m + 7n)(4m – 7n)	$4m^2 - 49n^2$
(4y – 3)(4y + 3)	$16y^2$-9
(5a + 6)(5a – 6)	$25a^2 - 36$
(5a + 4b)(5a – 4b)	$25a^2 - 16b^2$
(6t + 3)(6t – 3)	$36T^2 - 9$

Multiplying- Subtract the square of the second term in the parenthesis from the square of the first term
Factoring- Use the square root of each term in the expression and add and subtract each in separate parenthesis

PAIR EXERCISE- TWO COLUMN FORMAT COMBINING ENGLISH AND MATH

With your partner, discuss each step of the process of solving the given equation and explain your steps in English in the right hand column. Try to reach an agreement on the language you wish to use BEFORE writing your explanations.

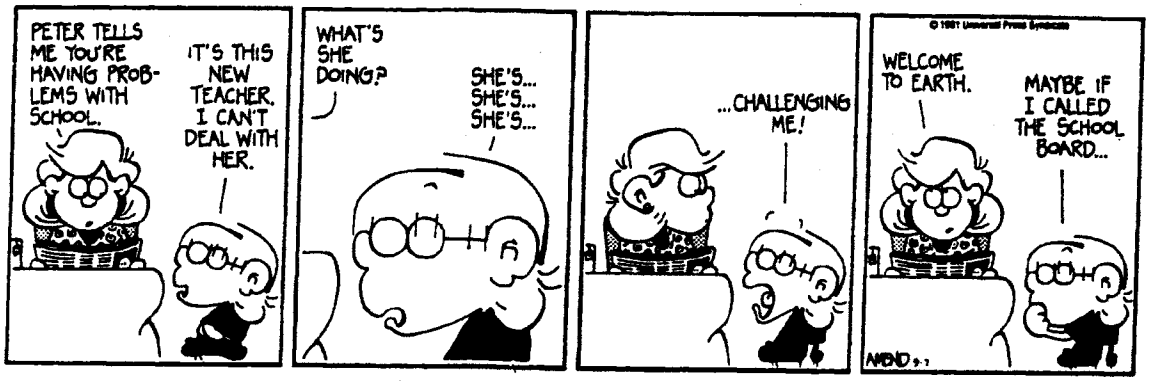
$\frac{X}{X-4} - \frac{2}{X+3} = \frac{20}{X^2 - X - 12}$	This is the starting equation. Explain what procedures are needed to get to the next step
$\frac{X}{X-4} - \frac{2}{X+3} = \frac{20}{(X-4)(X+3)}$	
LCD= $(X+3)(X-4)$	
$(X+3)(X-4)\left(\frac{X}{(X-4)} - \frac{2}{(X+3)}\right) = \frac{20\,(X+3)(X-4)}{(X-4)(X+3)}$	
$X^2 + 3X - 2X + 8 = 20$	
$X^2 + X - 12 = 0$	
$(X+4)(x-3)=0$	
$X = -4$ $X = 3$	

PAIR EXERCISE- TWO COLUMN FORMAT COMBINING ENGLISH AND MATH

With your partner, discuss each step of the process of solving the given equation and explain your steps in English in the right hand column. Try to reach an agreement on the language you wish to use BEFORE writing your explanations.

$\frac{-2}{X+5} + \frac{3}{X-5} = \frac{20}{X^2-25}$	This is the starting equation, Solve the equation explaining each of your steps in the right hand column

FOX TROT by Bill Amend



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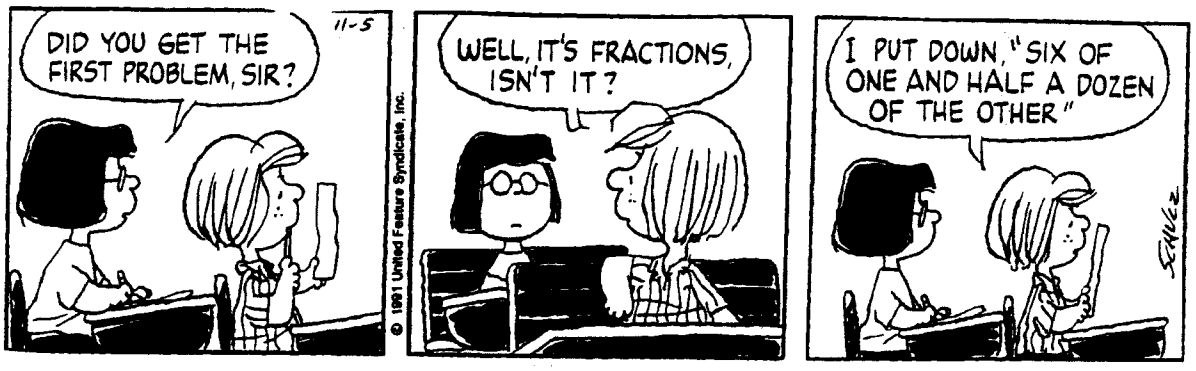

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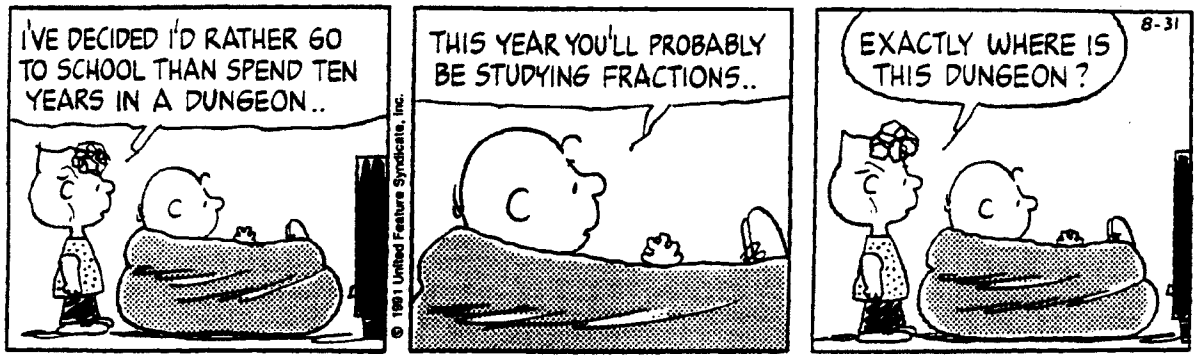

PEANUTS