

Algebra 1 DSPA's - General Guidelines

The district assessments in this booklet will be given following these guidelines:

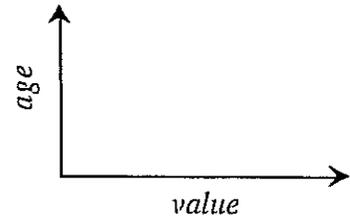
- MA-A1-01 Algebraic Expressions & Problem Solving** - To be given after the completion of Chapters 1 & 2 in Algebra Connections.
- MA-A1-02 Pattern Recognition & Graphing Linear Equations** - To be given after the completion of Chapters 3 & 4 in Algebra Connections.
- MA-A1-03 Multiplying Polynomials, Solving Equations, Proportional Reasoning, and Systems of Equations** - To be given after the completion of Chapters 5 & 6 in Algebra Connections.
- MA-A1-04 Linear and Quadratic Functions** - To be given after the completion of Chapter 7 and through section 8.2.5 of Chapter 8 in Algebra Connections.
- MA-A1-05 Factoring Polynomials, Solving Quadratic Equations, and Exponents** - To be given after the completion of Chapter 8 and section 10.4 in Algebra Connections. (Chapter 9 and Sections 10.1 through 10.3 are optional sections to teach after all the DSPA's have been given).
- MA-A1-06 Data Analysis and Probability** - To be given after teaching a supplementary unit on data analysis and probability. This can be completed at any time during the year, with teachers from each building agreeing on an opportune time to teach it at their school.

Directions for Teachers: Give the assessments in the time frame as described above. Read the following directions to the students before each DSPA.

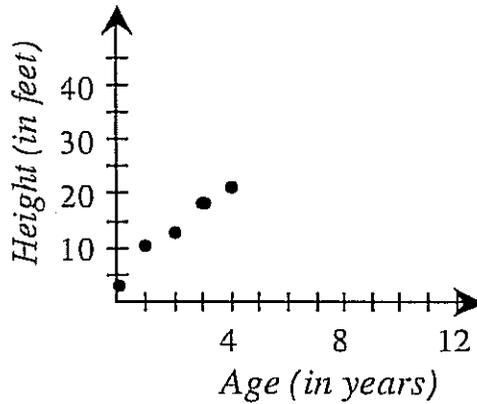
Directions for Students: Read each question carefully, and complete each problem showing your work when necessary. Scientific and graphing calculators can be used on this assessment.

1) The graph at right is used to compare the age of a car with its value. Place a point (dot) for each (15pts) of the following. Make sure you label each point.

- a. R, an old and very valuable car.
- b. S, a not-too-old but worthless car.
- c. T, a very new and very valuable car.

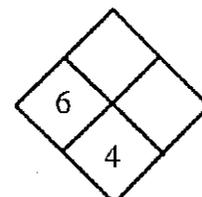
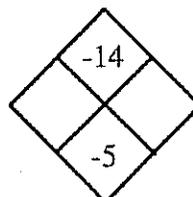
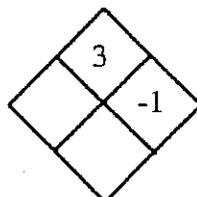
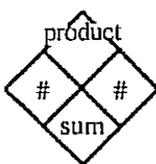


2) The graph below shows the height of a shrub after it was planted. (10pts)



- a. Based on the data in the graph, predict how tall the tree was 5 years after it was planted.
- b. If the shrub keeps growing in the same way, predict when it will be 40 feet tall.

3) Solve the diamond problems below. (12pts)



4) Use the guess and check table below to solve the following problem.

(9pts)

The length of a rectangle is 6 cm longer than the width. The perimeter of the rectangle is 92 cm. Find the length and the width of the rectangle.

Width	Length	Perimeter ($2W + 2L$)	Too High/Too Low

Width = _____ Length = _____

5) Solve the following problem. Use a guess and check table if you wish. Kim and Leon together have \$111. If Kim has \$17 more than Leon, how much does each person have?

(9pts)

Kim has \$_____ Leon has \$_____

6) Evaluate the expressions below when $x=3$, $y=5$, $z=-2$. Show your work.

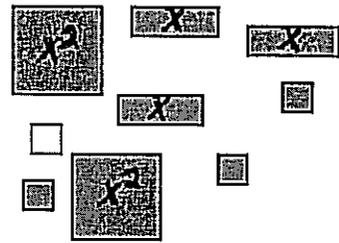
(15pts)

a) $4x + 5$

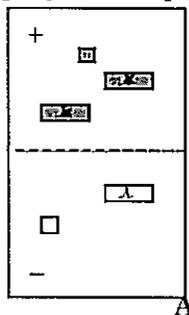
b) y^2

c) $3z + 7x$

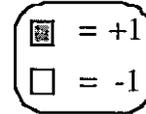
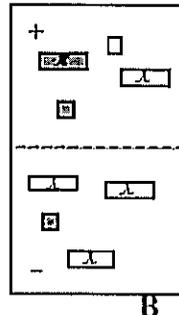
- 7) Write an algebraic expression representing the collection of algebra tiles shown below.
 (4pts) Note: Shaded tiles are positive, and white tiles are negative.



- 8) First, simplify each expression mat shown below. Then determine which is greater.
 (6pts)



Which is greater?



Write the value of each expression mat below:

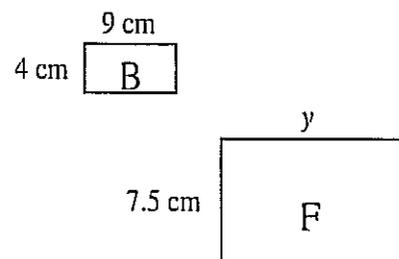
Which is greater? 1st expression or 2nd expression? _____

- 9) Simplify the following expressions by combining like terms. Using algebra tiles or drawing diagrams may be helpful.
 (10pts)

a) $4y^2 - 2y - x^2 - 76 + 2 + 5y^2 =$

b) $2xy + 5x - 3xy + 3y^2 - y^2 + 8 - 2x =$

- 10) Rectangle F is an enlarged photocopy of rectangle B. Find the length of y. Remember to label all numbers and explain your ideas clearly.
 (10pts)



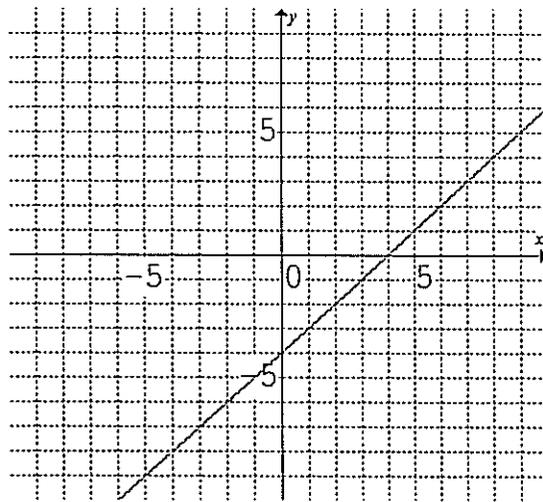
- 1) Use your pattern-detection skills to find a rule for the table below. Assume that the graph of the rule should be a straight line.

IN (x)	-2	-1	0	1	2	3	
OUT (y)	-5		1	4		10	

- (8pts) a. Complete the table.
- (4pts) b. Find a rule (or equation) that relates the input value, x , to the output value, y .

- 2) Use the graph below to answer the following questions.

(16pts)



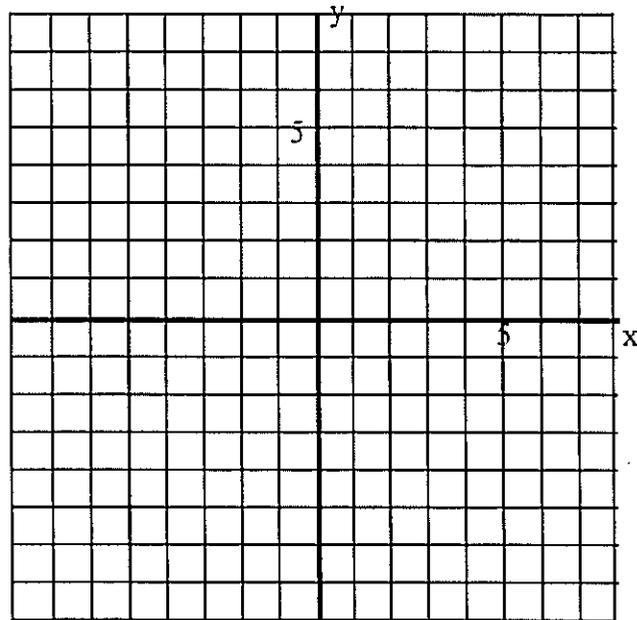
- a. For a point on the line, if the x -coordinate is -4 , what is the y -coordinate?
- b. For a point on the line, if the y -coordinate is 3 , what is the x -coordinate?
- c. What are the coordinates (ordered pair) where the line crosses the x -axis?
- d. What are the coordinates (ordered pair) where the line crosses the y -axis?

- 3) Complete the table for the rule $y = 2x - 1$. Then use the table to graph the rule neatly.

IN (x)	-2	-1	0	1	2	3
OUT (y)						

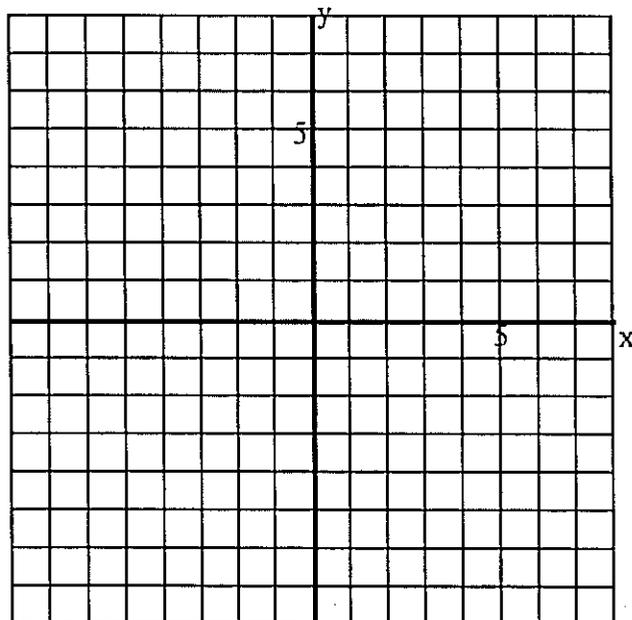
(12pts)

(8 pts)

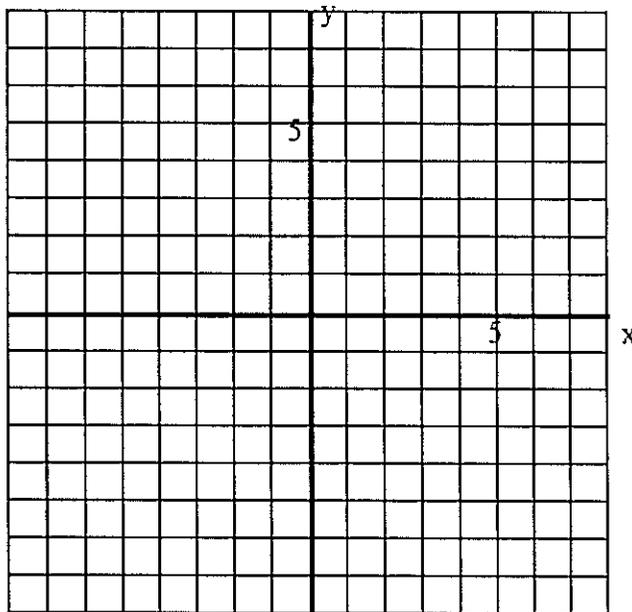


- 4) Graph $y = -\frac{1}{2}x + 3$ below. You can use your knowledge of $y = mx + b$, or make a table.

(6pts)



- 5) Graph $y = 3x - 5$ and $y = -x + 3$ on the same set of axes. Find and label the point of intersection.
(12pts)



Explain or show work to prove that your answer (point of intersection) is correct.
(3pts)

- 6) Use a table or graph (or combination of these methods) to find and check the solution for the following problem.

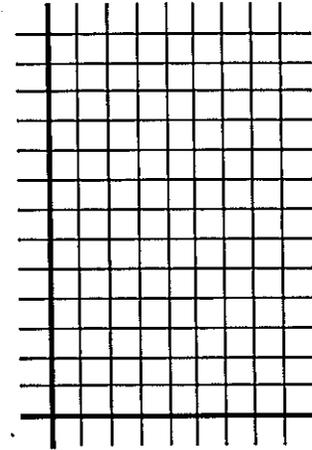
Glenn puts tomato plants in his garden every spring. His Roma tomato plants are 3 inches tall when he plants them, and they grow 2 inches per week. His cherry tomato plants start as seeds (0 inches) and grow 3 inches per week.

(5pts) When will both types of tomato plants be the same height?

(5pts) How tall will they be (when they are at the same height)?

(5pts for the table or graph.)

	Week 0	Week 1			
Roma					
Cherry					



- 7) Study the tile pattern below.



Figure 1

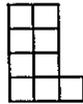


Figure 2

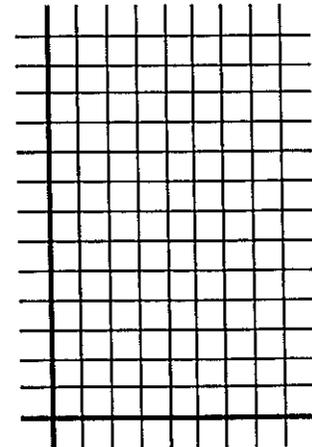


Figure 3

- a. Complete the $x \rightarrow y$ table comparing the figure number and the total number of tiles in each of the tile figures.

(4pts)

Fig. # (x)	0	1	2	3
# of squares (y)				



- b. Use the $x \rightarrow y$ table to graph the pattern.

(4pts)

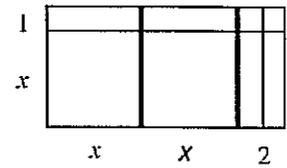
- c. Explain how the growth pattern in the figures is connected to the numbers in the table and the line that you graphed. (Use the terms **y-intercept** and **slope** in your explanation).

(4pts)

- d) How many tiles would be in Figure #5?

(4pts)

- 1) Write the area of the rectangle as a product and as a sum.
(6pts)



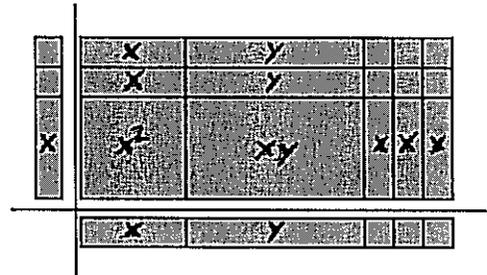
- 2) Find the dimensions (length and width) of the rectangle below. Write the area as the product of the dimensions and as the sum of the tiles. Remember to combine like terms whenever possible.
(12pts)

Length = _____

Width = _____

Area as a product = _____

Area as a sum = _____



- 3) Rewrite the following expressions using the Distributive Property or generic rectangles.
(16pts)

a) $2(3x + 7)$

b) $5y(2y - 3)$

c) $(x + 3)(x + 5)$

d) $(2x + 1)(3x + 2)$

4) Solve each equation showing each step.

(16pts)

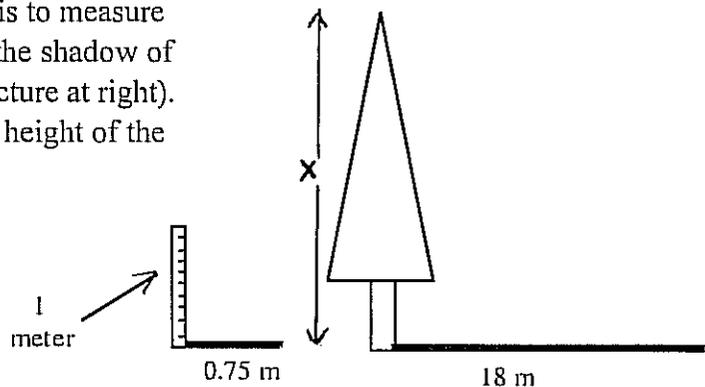
a) $5x + 7 = 27$

b) $9x + 6 - 4x = 2x + 1 - 16$

c) $3(x - 4) = 3$

d) $2x^2 - 2x + 5 = 2x^2 - 7x - 15$

5) One way to find the height of a tall tree is to measure its shadow and then compare that with the shadow of an object whose height is known (see picture at right). Write and solve a proportion to find the height of the tree.



6) In a recent survey, seven out of ten basketball players recommended Itch-Gone athlete's foot powder. If 150 players were surveyed, how many recommended Itch-Gone foot powder?

(6pts)

7) Find the point of intersection for each pair of lines below by using the elimination method. Be sure to show your steps algebraically and check each solution once you are finished. (20pts)

a. $2x + 3y = 18$
 $2x - 3y = -6$

b. $7x - 4y = 26$
 $3x + 4y = -6$

8) Solve the following system of equations by substitution. Show your work and check your answer. (10pts)

$$x = 3y + 2$$
$$4x + 5y = 42$$

9) Find Tom's age and Janet's age by setting up and solving a system of equations.

(8pts)

Tom is 8 years older than Janet. Together, their ages total 38. Find the age of each person.

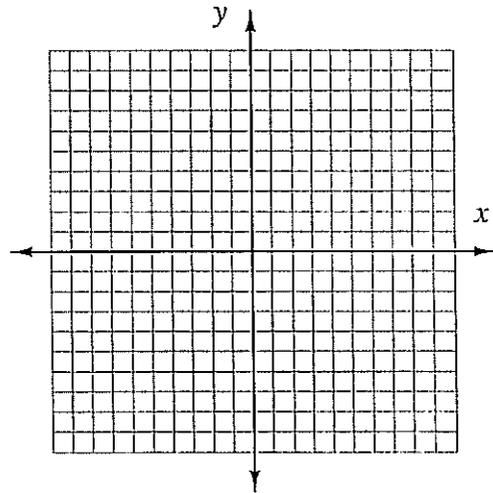
1) Draw and label graphs for the four equations listed below and then explain (see below) how the slope affects the graph of a line.
(16pts)

a. $y = 4x$

b. $y = \frac{1}{2}x$

c. $y = -2x$

d. $y = 0x$



Explanations -- What happens to the line when the:

(5pts)

slope is large (like 4 in part a above) -

slope is small (like 1/2 in part b above) -

slope is positive -

slope is negative -

slope is zero -

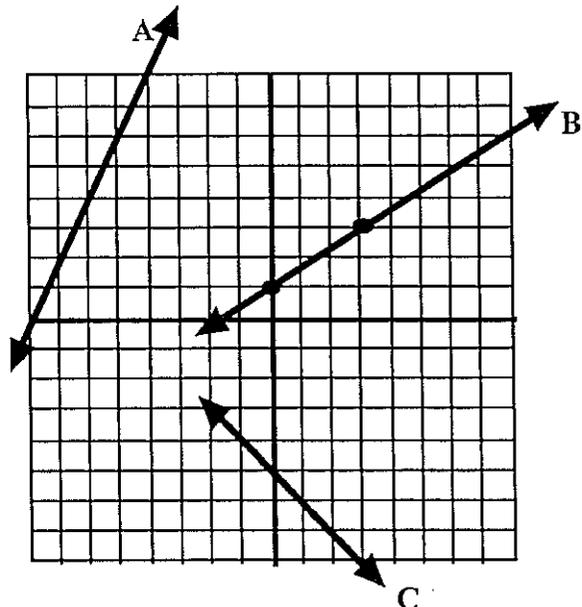
2) Find the slope for each line below.

(15pts)

Slope of Line A is _____

Slope of Line B is _____

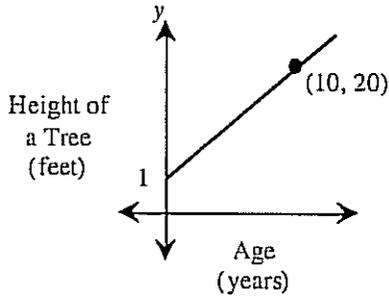
Slope of Line C is _____



- 3) Examine the graph below and explain what real-world quantities the slope and y-intercepts represent. Use the correct units (labels) when explaining.

The slope represents:

The y- intercept represents:



- 4) Study the tile pattern below.



Figure 0

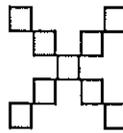


Figure 1

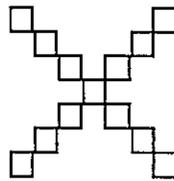
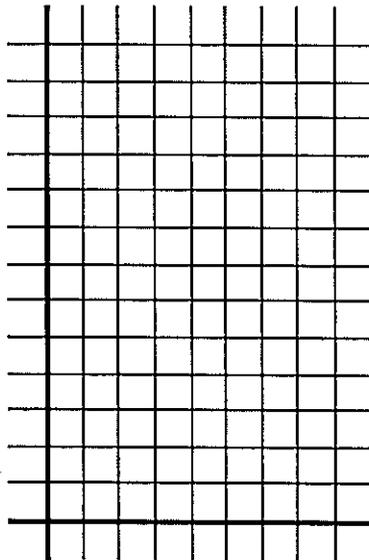


Figure 2

- (6pts) a. Make an $x \rightarrow y$ table comparing the figure number and the total number of tiles for the tile pattern.
 (3pts) b. Graph the pattern.

Fig. #	# of tiles

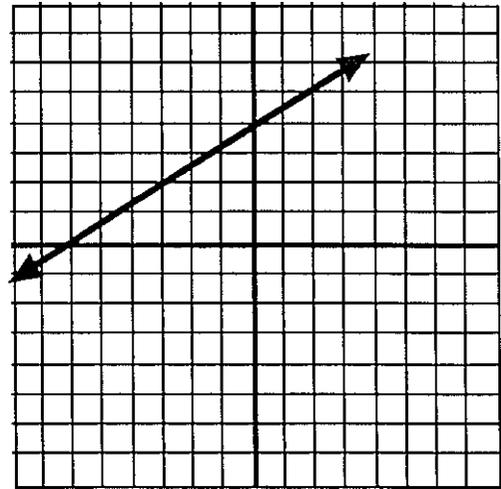


- (3pts) c. Explain how the growth pattern in the figures is connected to the numbers in the table and the line that you graphed. Explanation (Include the words slope and y-intercept in your explanation):

5) Examine the line shown on the graph.

(15pts)

- a) Name the slope of a line that is parallel to this line. _____
- b) Name the slope of a line that is perpendicular to this line. _____
- c) What is the equation (rule) of the line shown on the graph? _____

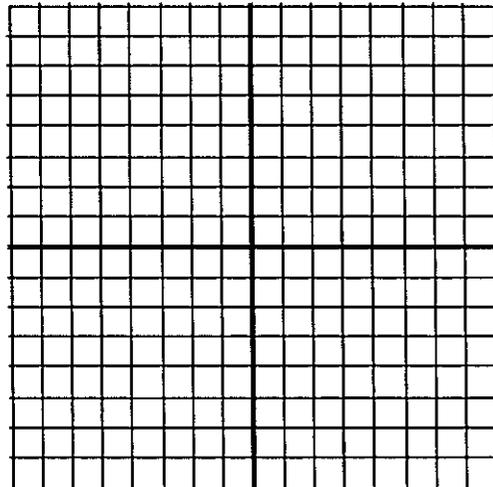


6) Make a table and graph the parabola $y = x^2 - 2x - 3$. Be sure to label the vertex and the x-intercepts.

(13pts total)

(7 for table, 3 for graph, 3 for labels)

x	y
-2	
-1	
0	
1	
2	
3	
4	



7. Match each parabola below with its equation (rule). Place a letter next to each graph, and then give a reason for your choice of equation for each parabola.

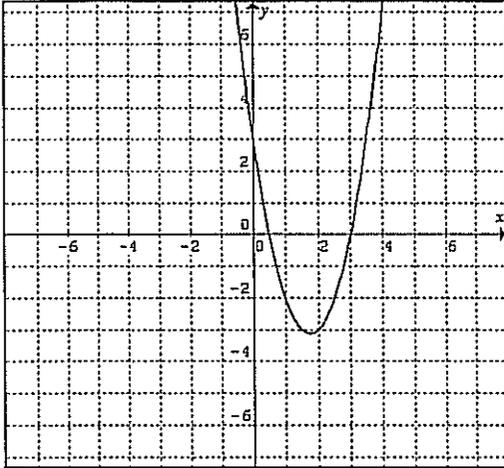
(18pttotal)

(5 for each answer, 1 for each reason)

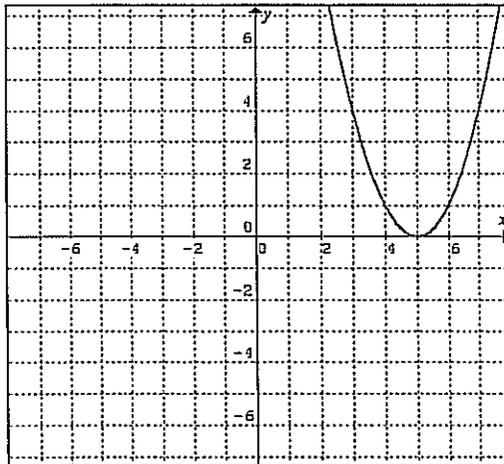
a) $y = (x - 5)^2$

b) $y = -2x^2 - 2$

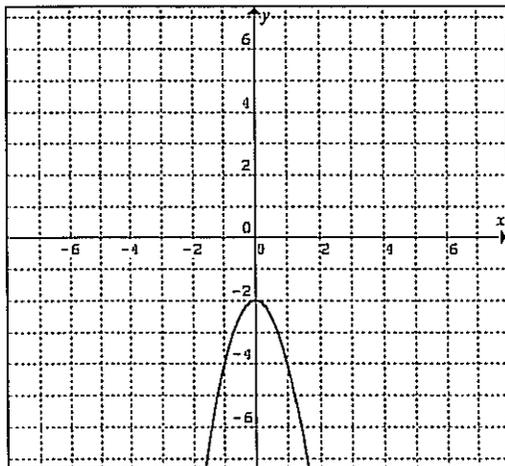
c) $y = 2x^2 - 7x + 3$



Answer _____ Reason:



Answer _____ Reason:



Answer _____ Reason:

1) Factor the following.

(30pts)

a. $x^2 + 7x + 12$

b. $8x + 10$

c. $x^2 - 25$

d. $x^2 + 3x - 10$

e. $x^2 - 9x + 14$

f. $6x^2 + 13x + 5$

2) Solve the following by factoring and using zero products.

(10pts)

a. $x^2 + 9x + 20 = 0$

b. $x^2 - 3x - 10 = 0$

3) Solve by factoring and using zero products.

(15pts) Show your work below.

$$x^2 + 3x + 2 = 0$$

Solve the same equation using the quadratic formula. Show your work below.

$$x^2 + 3x + 2 = 0$$

Are your solutions the same? _____ Should they be the same? _____

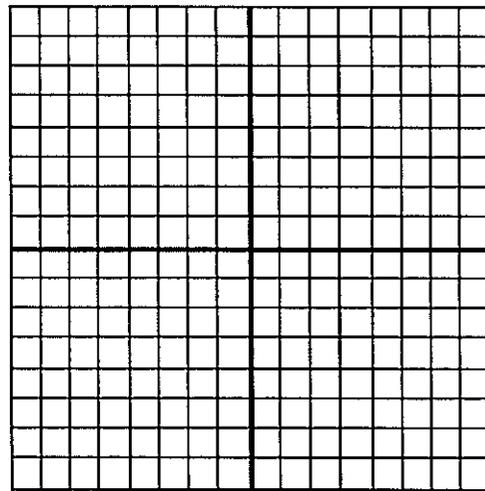
Explain:

- 4) Solve using the quadratic formula. You can leave your answers in radical form (with a square root sign), or use a calculator to change your answers to decimals.
(5pts)

$$x^2 + 5x + 3 = 0$$

- 5) Complete the table and graph the parabola: $y = x^2 - 3x - 4$
(10pts total - 4 table, 2 graph, 2 solve, 2 explanation)

x	y
-2	
-1	
0	
1	
2	
3	
4	
5	



Now solve the related equation from above by factoring and zero products:

$$x^2 - 3x - 4 = 0$$

How do the x-intercepts of the graph relate to the solutions to the equation?

6) Simplify the following expressions.
(30pts)

a. 5^3

b. $x^2 \cdot x^5$

c. $(x^2)^5$

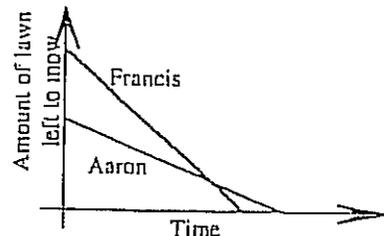
d. $(x^4)(x^7)(x^2)$

e. $\frac{x^5}{x^2}$

f. $(3x^5)^2$

1. (20 pts.) A bag contains five blue marbles, three green marbles and four yellow marbles. If one marble is drawn out at random, what is the probability that it is:
- a) yellow?
 - b) red?
 - c) either blue or green?
 - d) A boy reached in the bag, grabbed a marble, and replaced it. He did this 20 times. The boy said that he grabbed a blue marble 18 times, and a green marble twice. Do you think this is likely? Explain.

2. (20 pts.) Examine the graph at right carefully.



- a) Write a sentence or two explaining what the graph tells us.
- b) Who has more lawn to mow? Explain how you know.
- c) Who finishes mowing first? Explain how you know.
- d) Give a sound reason for why Francis's graph descends (drops) more quickly than Aaron's.

3. (20 pts.) Find the mean, median, mode and range for the following quiz scores.

20, 25, 22, 30, 25, 15, 29

mean:

median:

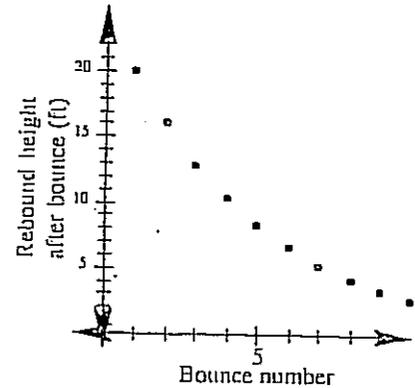
mode:

range:

4. (20 pts.) If you roll one six-sided die,
- What is the probability that the number you roll will be a factor of 30? (This means the number can divide into 30 evenly). Justify your answer.
 - What is the probability that the number you roll will be odd? Justify your answer.

5. (20 pts.) In an experiment, a ball is dropped and allowed to keep bouncing. The graph at right shows the data collected.

- After the first bounce, how high did the ball rebound(bounce) back up? Explain how you know.
- How high did the ball rebound after the fifth bounce?



- Should there be a point on the y axis, and if so, what does it represent?
- Should there be a point on the x-axis, and if so, what does it represent?