

Algebra 1 – Final Exam – Study Guide

Name: _____ Date: _____ Period: _____

Topics:

- Evaluating Expressions
- Distributive Property
- Combine Like-Terms
- Recursive Rule
- Explicit Rule
- Independent Variable
- Dependent Variable
- Writing expressions from words
- Identifying a linear function from a table of data
- Slope-Intercept Form of an Equation of a Line ($y = mx + b$)
- Identifying a graph from an Equation of a Line given in $y = mx + b$ format
- Solving an equation for y to transform the equation from Standard Form ($Ax + By = C$) to Slope-Intercept Form ($y = mx + b$).
- Find the Slope between two points using the Slope Formula.
- Solving multi-step equations for x .
- Solving a Linear System either by Substitution or Elimination Method.
- Evaluate functions for a given value.
- Given the value of a function, solving for x .
- Writing a System of Equations from a word problem and solving.
- Scatter Plots, Trend Lines and the equation of the trend line, make predictions based on the trend line.

PRACTICE PROBLEMS:

Evaluating Expressions:

Evaluate the expression $3y^2 + y - 7$, when $y = -2$

- a.) 7
- b.) 3
- c.) -21
- d.) 21

Evaluate the expression $4w^2 + w - 6$, when $w = -4$

- a.) 54
- b.) 22
- c.) -54
- d.) 74

Evaluate the expression $6x^2 + x - 8$, when $x = -3$

- a.) 25
- b.) 43
- c.) -43
- d.) -65

Evaluate the expression $2x^2 + x - 9$, when $x = -4$

- a.) 18
- b.) 19
- c.) -57
- d.) 213

Distributive Property and Combine Like-Terms (Show All Work):
(Hint: First Distribute then Combine Like-Terms)

1.) Solve the following equation for w: $3w - 4(w - 3) = 6$

2.) Solve the following equation for z: $3z - 6(z - 2) = 3$

3.) Solve the following equation for x: $6x - 5(x - 4) = 8$

4.) Solve the following equation for y: $9y - 6(y - 5) = 9$

Independent Variable and Dependent Variable:

You ate 250 calories for breakfast. Later in the day you were hungry, you dug into a pack of lollipops Ms. Angotta had given you because you had completed your classwork. Every time you eat a lollipop, you eat 10 more calories. What is the independent variable and what is the dependent variable?

- a.) Independent variable: 250 dependent variable: 10
- b.) Independent variable: calories dependent variable: lollipops
- c.) Independent variable: lollipops dependent variable: calories
- d.) Independent variable: eating dependent variable: breakfast

Writing expressions from words:

1. Which expression means “three times the sum of y and the square of 9”?
 - A. $3y + 9^2$
 - B. $3(y + 9)^2$
 - C. $3 * y + 9^2$
 - D. $3(y + 9^2)$

2. Identify the variable expression for, “two times the difference of x and the square of 7”?
 - A. $2x - 7^2$
 - B. $2(x - 7)^2$
 - C. $2 + x - 7^2$
 - D. $2(x - 7^2)$

3. Which expression means “twice the difference of w and the square of 6”?
 - A. $2y - 6^2$
 - B. $2(w - 6)^2$
 - C. $2 + w - 6^2$
 - D. $2(w - 6^2)$

Does the following table represent a linear function?

1.) Yes or No _____

Input	Output
x	y
1	4
2	5
3	6

2.) Yes or No _____

Input	Output
x	y
4	-2
6	-4
9	-6

3.) Yes or No _____

Input	Output
x	y
0	4
3	8
6	12

4.) Yes or No _____

Input	Output
x	y
4	-5
5	0
6	5

5.) Charlotte puts \$90 onto a new Starbucks gift card. Every morning, she uses the gift card to buy a cup of coffee for \$2.50. If she has \$70.00 left on her gift card, how many cups of coffee has she bought?

- a.) 12
- b.) 8
- c.) 14
- d.) 29.25

6.) William already has 35 Facebook friends, and he adds 5 more every week. This can be modeled by the function: $f(x) = 35 + 5x$, where $f(x)$ represents the total number of William's facebook friends and x represents the number of weeks that have gone by.

What does the statement $f(6) = 65$ mean in the context of the problem?

- a.) After 6 weeks, William has 65 friends
- b.) After 65 weeks, William has 6 friends
- c.) f times 6 equals 65
- d.) $f = 12.5$ friends

Solving an equation for y to transform the equation from Standard Form (Ax + By = C) to Slope-Intercept Form (y=mx + b):

7.) The equation, $2x - y = 5$, written in slope-intercept form, is which of the following:

- a.) $y = 2x - 5$
- b.) $y = -2x - 5$
- c.) $y = -2x + 5$
- d.) $y = 2x + 5$

8.) Find the Slope between two points using the Slope Formula:

Use: $\text{Slope} = m = \frac{y_2 - y_1}{x_2 - x_1}$

1.) Find the slope between the points (-3, 2) and (-2, 6)

2.) Find the slope between the points (-4, 3) and (-3, 9)

3.) Find the slope between the points (-5, 4) and (-4, 9)

4.) Using the table below, find the number of germs on the 5th day

Day	# of Germs
1	5
2	20
3	80
4	320

5.) Using the table below, find the number of germs on the 5th day

Day	# of Germs
1	7
2	14
3	28
4	56

Evaluate functions for a given value:

1.) Given the function $f(x) = 10x + x + 25 + 20(x + 3)$

a. Find the value of $f(6)$

b. If $f(x) = 240$, what is the value of x ?

2.) Sammy is creating a company called Dynamic-Sound to create the ultimate music listening experience. The function $f(x) = 20x + x + 50 + 30(x + 2)$ represents his total cost; x represents the number of customers he has. Each pair of headphones costs \$20, each person needs a \$1 license for the website ($1x$), it costs \$50 to get a domain name, and it costs \$30 for each $x + 2$ iPod Nanos (he's keeping 2 for himself).

a. Find the value of $f(5)$. (Hint: plug in 5 for x and simplify!)

b. Determine how many customers he has if his total cost is \$416?

c. Describe, in words, what your solutions to parts a. and b. represent in the context of the problem. Be sure to use units in your answer.

Identifying the graph from an Equation of a Line given in $y = mx + b$ format

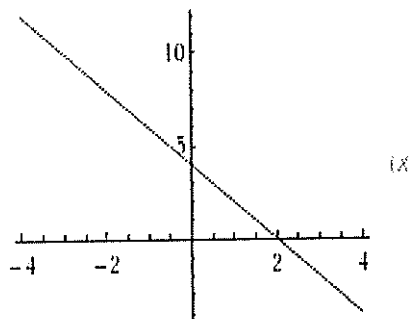
The graph below is best represented by which equation?

a.) $y = 2x + 4$

b.) $y = \frac{1}{2}x + 4$

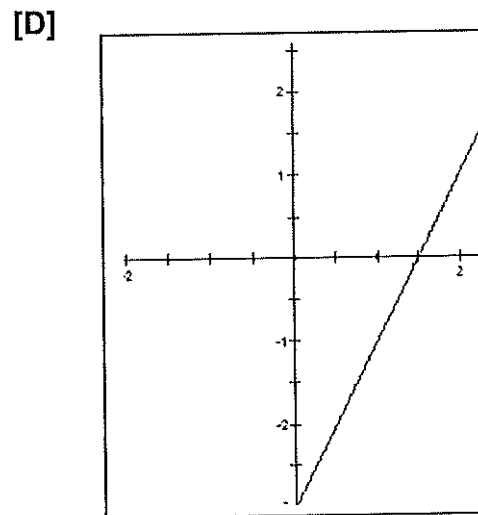
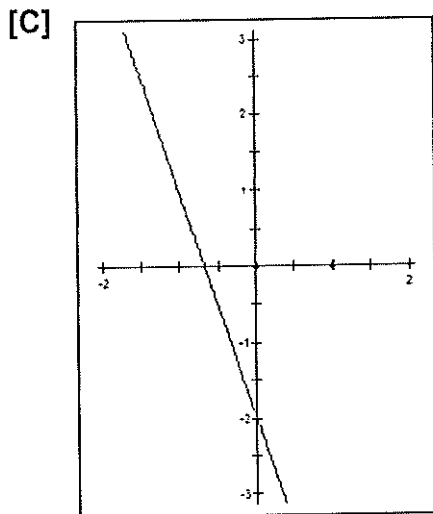
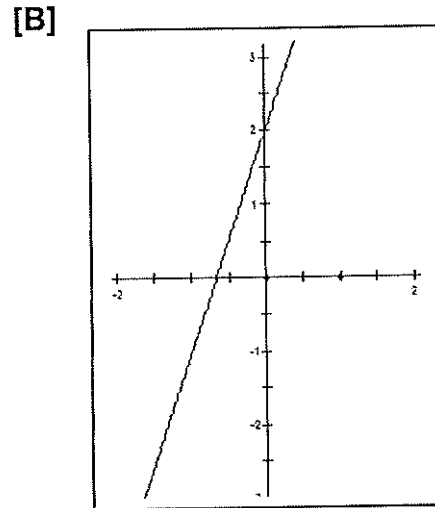
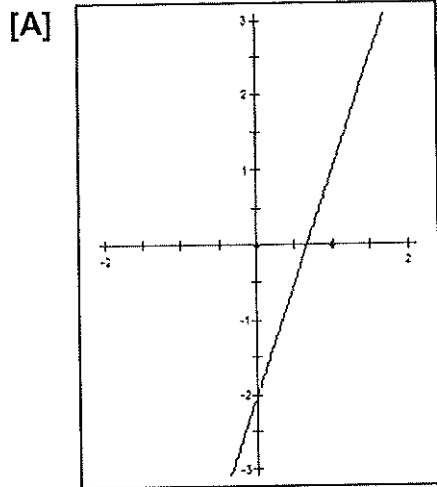
c.) $y = -2x + 4$

d.) $y = -2x - 4$



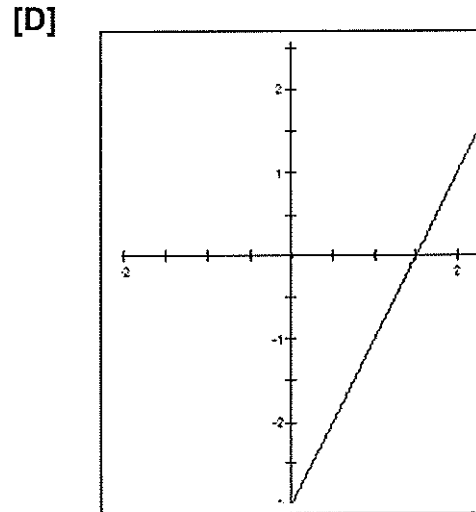
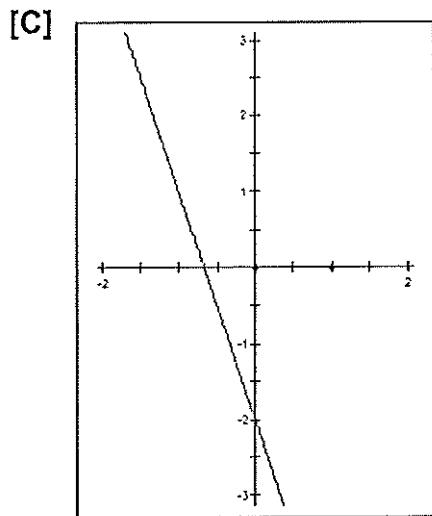
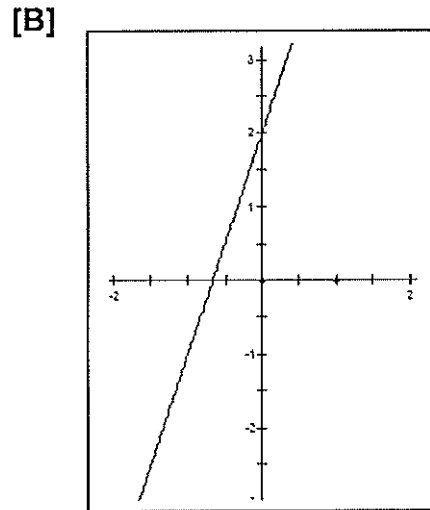
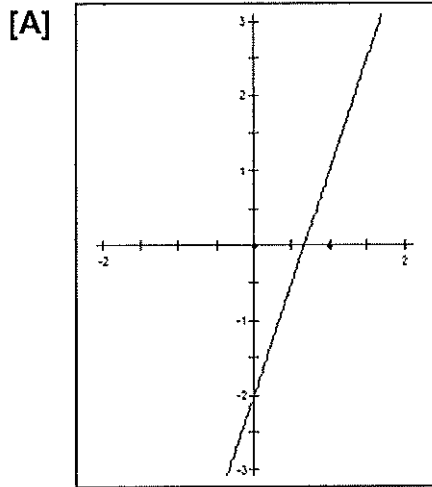
Identifying the graph from an Equation of a Line given in $y = mx + b$ format

4. Which graph below best represents $y = -3x - 2$?



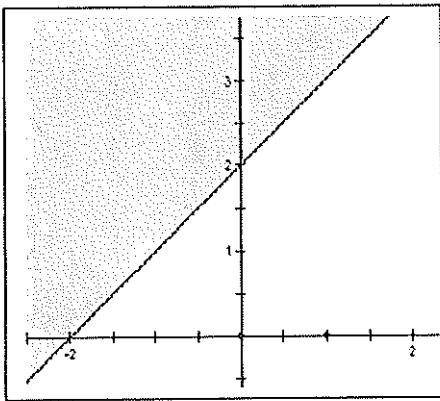
Identifying the graph from an Equation of a Line given in $y = mx + b$ format

5. Which graph below best represents $y = 3x + 2$?

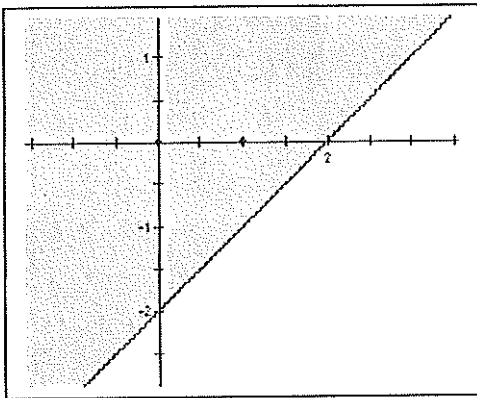


6. Choose the graph below that best represents the equation: $x - y = 2$

[A]

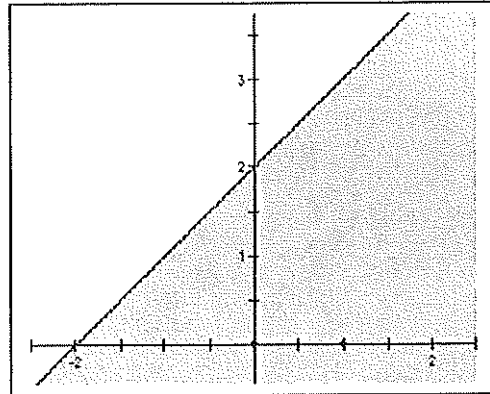


[B]

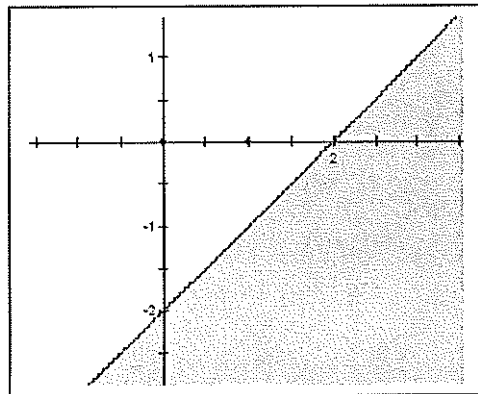


7. Choose the graph below that best represents the equation: $x - y = -2$

[A]



[B]



Open-Ended

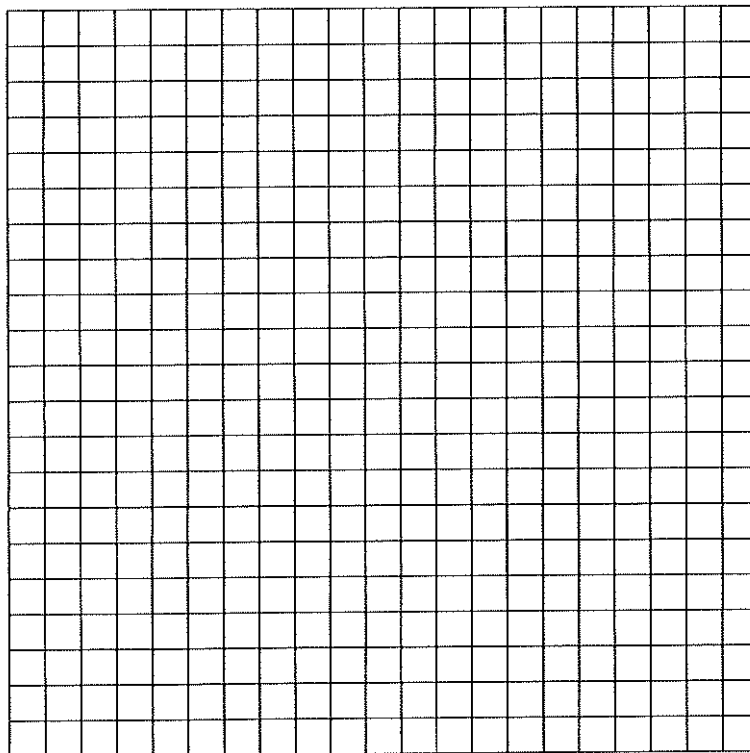
Solve the problem and show ALL work or explain how you arrived at your answer.

61. Sancho received 5 video games for his birthday along with a membership to a videogame club that will mail him 2 new games to play every month.

- a. Make a table showing the number of videogames Sancho has in his collection each month for the first 6 months.

Month	# of Videogames
0	
1	
2	
3	
4	
5	
6	

- b. Plot the points in a coordinate plane.



Pedro's Stamps continued:

- c. Write an equation in function notation to represent the information.

- d. Use the equation to find out how many videogames Sancho will have after five years.

50.) Solve the following Linear System of Equations either by Substitution or the Elimination Method: (HINT: Solve by the Substitution method – you must first solve for x !!!).

$$\begin{aligned}x + 3y &= 2 \\2x - y &= -10\end{aligned}$$

What is the value of x?

What is the value of y?

Use the linear equations below to answer questions 51 & 52. (HINT: Solve by the Substitution method – you must first solve for x !!!).

$$\begin{aligned}x + 3y &= 7 \\4x - y &= 15\end{aligned}$$

51) What is the value of x?

52) What is the value of y?

61.) Ellen's Electric Company charges \$100 and an additional \$20 per hour to do electrical work on your house. Marcus's Maniac Electricians charges \$40 and an additional \$35 per hour to do electrical work on your house.

a. Define your variables and write a system of equations to model this scenario.

b. Solve the system of equations.

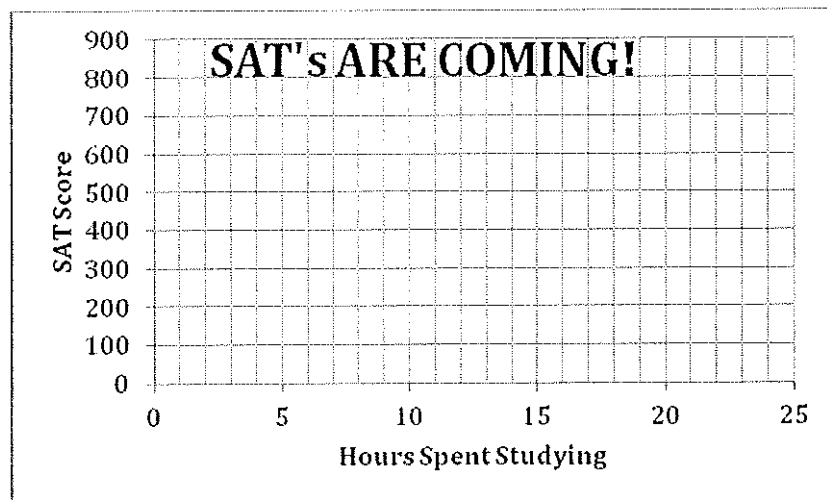
c. What does your solution mean in the context of the problem? When is it better to use Ellen's Electric Company, and when is it better to use Marcus's Maniac Electricians?

62.) The minimum score on the SAT English section is a 200, and the maximum score is an 800. The table below shows a survey of nine students' hours spent studying and their score on the Math portion of the SAT.

Hours Spent Studying	English SAT Score
4	380
9	570
10	640
14	750
4	400
7	510
12	650

a.) Plot the data on

the following grid.



b.) Draw in a trend line on the grid. Then find the equation of the trend line.

c.) Use the trend line to predict the score a student would get if they studied for 7 hours. Show your work or explain how you got your answer.