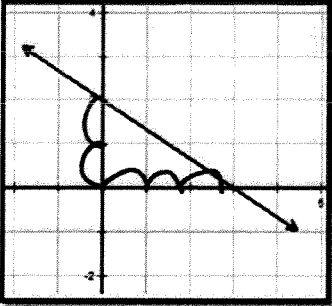**Name:** _____   **Date:** _____

Practice Test Unit 3: Linear Equations and Inequalities

1) Which of the following is a linear equation:

   1. $-3x + 2$ 3. $x^3 + 5x + 2 = -3$

   (2.) $-x + 7y = 12$ 4. $x^2 + 2x + 4 = 4$

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2) If $(k, 4)$ is a point on the graph of the equation $4x + 2y = 4$, what is the value of k?

   1. 1   3. 6
   2. -1   4. -6

$4x + 2(4) = 4$
$4x + 8 = 4$
$-8-8$
$\dfrac{4x}{4} = \dfrac{-4}{4}$
$\boxed{x = -1}$

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3) Use the table below to find the x- and y-intercepts.

   1. x-intercept: -6; y-intercept: 4
   2. x-intercept: 4 ; y-intercept: -6
   3. x-intercept: -6; y-intercept: -9
   4. x-intercept: -2; y-intercept: -6

x	y
-2	-9
0	-6
2	-3
4	0

y intercept

x intercept

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4) What is the slope of the line containing the points (3,4) and (-6,10)?

   1. $\dfrac{1}{2}$ 2. 2   3. $-\dfrac{2}{3}$ 4. $-\dfrac{3}{2}$

$\dfrac{6}{-9} = \dfrac{-2}{3}$ $\begin{array}{c|cc} & x & y \\ \hline 3 & 4 \\ -6 & 10 \end{array}$

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5) Which equation is represented by the graph of line L?

   1. $x = \dfrac{-2}{3}y + 2$
   2. $y = \dfrac{-2}{3}x + 2$
   3. $y = 2x + \dfrac{-2}{3}$
   4. $y = \dfrac{-2}{3}x + 3$

$m = \dfrac{-2}{3}$
$b = 2$

$y = \dfrac{-2}{3}x + 2$

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6) What is the y-intercept of the graph of the equation $y = -\dfrac{2}{3}x + 4?$

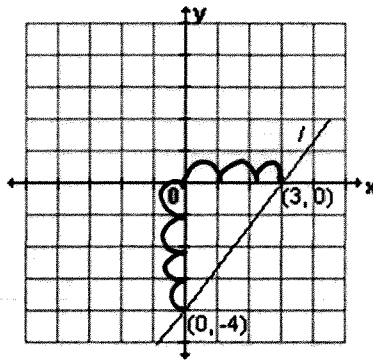   1. $-\dfrac{2}{3}$ 2. -2   3. 3   (4.) 4

7) Use the graph below to find the x-and y-intercepts.

1. x-intercept: 2; y-intercept: 6
2. x-intercept: –3 ; y-intercept: 6
3. x-intercept: 2; y-intercept: –3
4. x-intercept: 6; y-intercept: 2

(2. is circled)

(handwritten on graph: y intercept, x intercept)

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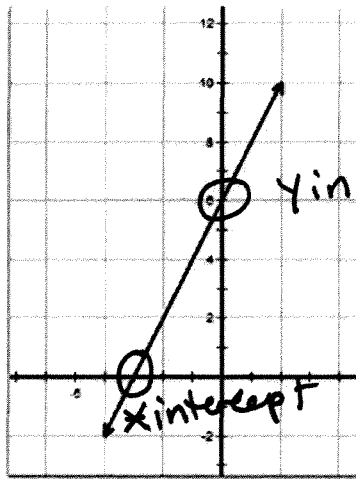
6) What is the slope of line *l* shown in the accompanying diagram?

1. $\frac{4}{3}$

2. $-\frac{3}{4}$

3. $\frac{3}{4}$

4. $-\frac{4}{3}$

(1. is circled)

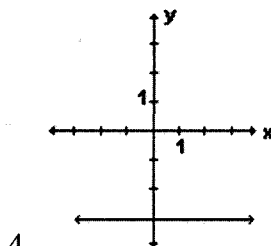*(graph labeled (3, 0) and (0, –4))*

(handwritten: $m = \frac{4}{3}$)

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7) If x and y are defined as indicated by the accompanying table, which equation correctly represents the relationship between x and y?

1. $y = x + 2$
2. $y = 2x + 2$
3. $y = 2x + 3$
4. $y = 2x - 3$

(4. is circled)

x	y
2	1
3	3
5	7
7	11

(handwritten: 1 < 2, m = $\frac{4}{2}$ 2)

$1 = 2(2) + b$
$1 = 4 + b$
$-4 \quad -4$
$b = -3$

$y = 2x - 3$

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8) Which graph represents the equation $Y = 3$?

1.

3.

2.

4.

(2. is circled)
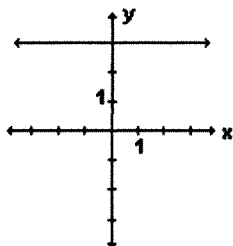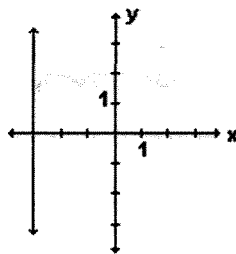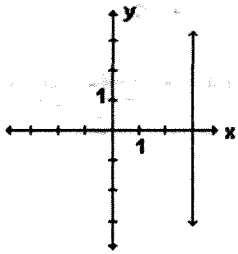
*brownie cost

10) Maddi bought 3 brownies for 4 dollars. which of the following statements is true:	$m = \dfrac{4}{3}$

1. The independent variable is the cost in dollars, the dependent variable is number of brownies, and the slope is $\dfrac{4}{3}$

2. The independent variable is the number of brownies, the dependent variable is cost in dollars, and the slope is $\dfrac{3}{4}$

3. The independent variable is the cost in dollars, the dependent variable is number of brownies, and the slope is $\dfrac{3}{4}$

4. The independent variable is the number of brownies, the dependent variable is cost in dollars, and the slope is $\dfrac{4}{3}$

Extended Response Questions:

11) Find the x intercept and the y-intercept of the following equation algebraically:

$$4x - 2y = 16$$

x-intercept $y = 0$
$4x - 2(0) = 16$
$\dfrac{4x}{4} = \dfrac{16}{4}$ $x = 4$

y-intercept $x = 0$
$4(0) - 2y = 16$
$\dfrac{-2y}{-2} = \dfrac{16}{-2}$
$y = -8$

12) Answer the following questions based on the linear equation

$$5y + 3x = 15$$
$$-3x \quad -3x$$

a. Rearrange the following standard form linear equation in the slope-y-intercept form

$\dfrac{5y}{5} = \dfrac{-3x}{5} + \dfrac{15}{5}$

$y = -\dfrac{3}{5}x + 3$

b. Complete the table:
c. Graph the linear equation
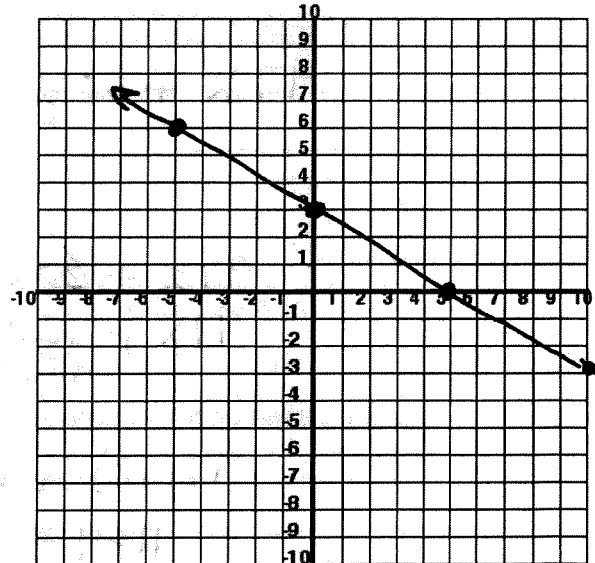d. What is the value of x when $y = -3$?

$x = 10$

e. Identify the intercepts

x-intercept $= 5$

y intercept $= 3$

x	y
-5	6
0	3
5	0
10	-3

13) Before beginning voice lessons, Johnny already knew how to sing 2 pieces, and he expects to learn 2 new pieces during each week of lessons.

$b = 2$ $m = 2$

a. Write an equation that shows the relationship between the number of weeks w and the number of pieces learned p.

$$P = 2w + 2$$

b. Identify the parameters, and what they mean in the context of the situation.

2 is the intial number of pieces that Johnny knew
2 is the number of pieces that Johnny learns each week

c. How many weeks does it take Johnny to learn 16 pieces?

$$16 = 2w + 2$$
$$-2 \qquad -2$$
$$\frac{14}{2} = \frac{2w}{2} \qquad w = 7 \text{ weeks}$$

d. How many pieces will Johnny learn by the third week?

$$P = 2(3) + 2$$
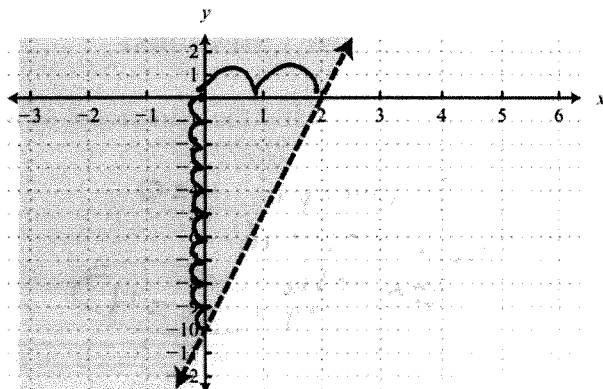$$P = 6 + 2$$
$$P = 8 \text{ pieces}$$

14) Write the linear inequality for the half plane:

$b = -10$ $m = \frac{10}{2} = 5$

$$y > 5x - 10$$

15) The Sparrow town High School science department can spend less than $4,700 on textbooks this year. The department needs to buy both Biology textbooks(x), which cost $97 apiece, and Chemistry textbooks(y), which cost $60 apiece.

a. Write a linear inequality to describe this situation.

$$97x + 60y < 4700$$

b. What is the maximum number of biology text books that can be purchased if 20 Chemistry books are purchased?

$$97x + 60(20) < 4700 \qquad \frac{97x}{97} < \frac{3500}{97}$$
$$97x + 1200 < 4700 \qquad\qquad 36$$
$$-1200 \quad -1200 \qquad x < 36.08 \quad \text{biology}$$
Books

c. Can the department purchase 15 chemistry text books and 12 biology text books without being over budget?

$$97(12) + 60(15) < 4700$$
$$1164 + 900 < 4700$$
$$2064 < 4700$$

yes. The cost will be $2064 which is less than the budget

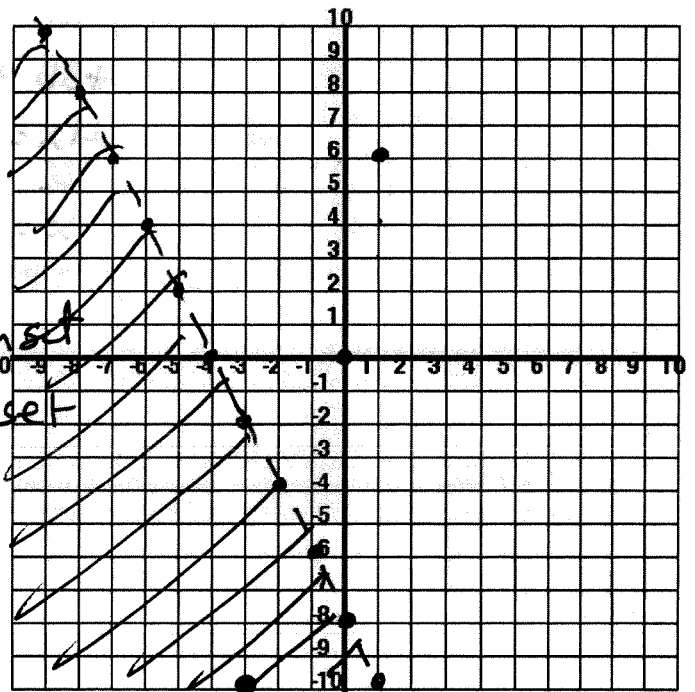16) Answer the following questions based on the inequality:

$$-3y - 6x > 24 \;\; +6X$$
$$+6X$$

a. Rearrange the following inequality in the slope-y intercept

$$\frac{-3y}{-3} > \frac{6x}{-3} + \frac{24}{-3}$$

$$y < -2x - 8$$

b. Graph the half-plane for the inequality

c. Determine if the following points are solutions in the half plane

A   (1,6)   NO   Not in the solution set

B   (0,0)   No   Not in the solution set

C   (-3,-10)   Yes   in the half plane

Answer the following review questions to study for the test

17) Find the sum of $3x^2 + 5x - 1$ and $x^2 - 2y - 7$

$$4x^2 + 3x - 8$$

1. $2x^2 - 7x - 6$
2. $-2x^2 - 7x + 6$
3. $4x^2 - 3x + 8$
4. $4x^2 + 3x - 8$ ⟵ (circled)

18) From $5x^2 - 6x + 8$, subtract $3x^2 - 2x - 4$.

$$5x^2 - 6x + 8 - (3x^2 - 2x - 4)$$
$$5x^2 - 6x + 8 - 3x^2 + 2x + 4$$
$$2x^2 - 4x + 12$$

1. $2x^2 + 6x - 12$
2. $2x^2 - 6x + 12$
3. $-2x^2 + 4x - 12$
4. $2x^2 - 4x + 12$ ⟵ (circled)

19) What is the product of $3y^2$ and $4y^5$?

$$3(4) = 12$$
$$y^2 (y)^5 = y^7$$

1. $7y^{10}$ 3. $7y^7$
2. $12y^{10}$ 4. $12y^7$ ⟵ (circled)

20) Express $(4x - 5)(6x + 5)$ as a trinomial.

$$24x^2 + 20x - 30x - 25$$
$$24x^2 - 10x - 25$$

1. $24x^2 - 10x - 25$ ⟵ (circled)
2. $24x^2 - 50x - 25$
3. $24x^2 - 25$
4. $-24x^2 + 25$

21) What is the value of x in the equation $13x - 2(x + 4) = 8x + 1$?

1. 1
2. 3
3. 2
4. 4

$13x - 2x - 8 = 8x + 1$

$11x - 8 = 8x + 1$

$-8x \qquad -8x$

$3x - 8 = 1$

$\qquad +8 \quad +8$

$\dfrac{3x}{3} = \dfrac{9}{3}$

$x = 3$

22) Solve for x in terms of a, b, and c: $\quad ax - 3b = c$

1. $\dfrac{a(c + 3b)}{c - 3b}$

2. $\dfrac{c - 3b}{a}$

3. $\dfrac{a(c - 3b)}{c + 3b}$

4. $\dfrac{c + 3b}{a}$

$+3b \quad +3b$

$\dfrac{ax}{a} = \dfrac{c + 3b}{a}$

$x = \dfrac{c + 3b}{a}$

23) Which inequality is represented in the accompanying graph?

-3   0   4

1. $-3 \le x < 4$
2. $-3 \le x \le 4$
3. $-3 < x < 4$
4. $-3 < x \le 4$

24) Which value of x is in the solution set of the inequality $-2x + 5 > 17$?

1. -8
2. -4
3. -6
4. 12

$-5 \; -5$

$\dfrac{-2x}{-2} > \dfrac{12}{-2} \qquad x < -6$

25) Choose the expression that mathematically represents 5 times a number less than 7.

1. $7 - 5x$
2. $7 - 5 + x$
3. $5 + y - 7$
4. $5x - 7$

$7 - 5x$

26) $(x + y) + z = x + (y + z)$ is an example of the which property

5. 1. Associative   3. Distributive

6. 2. Commutative   4. Multiplicative property of equality

27) Simplify $(x - 2)^2$

$(x - 2)(x - 2)$

$x^2 - 2x - 2x + 4$

$x^2 - 4x + 4$