

## EXAM REVIEW 1st Semester

### Unit 2: Linear Equations, Inequalities, and Systems

Name: \_\_\_\_\_

Hour: \_\_\_\_\_

1. Simplify and combine like terms:

a.  $2x - 3 - (-3x + 10)$

$$\begin{array}{r} 2x - 3 + 3x - 10 \\ \hline 5x - 13 \end{array}$$

b.  $-10x + 3(6x - 5)$

$$\begin{array}{r} -10x + 18x - 15 \\ \hline 8x - 15 \end{array}$$

2. Solve the following equations for the variable w.

a.  $4x - 6w = y$

$$\begin{array}{r} 4x - 6w = y \\ -4x \quad -4x \\ \hline -6w = y - 4x \\ \hline w = \frac{y - 4x}{-6} \end{array}$$

b.  $5 - w + 6 = 2w$

$$\begin{array}{r} 11 - w = 2w \\ +w \quad +w \\ \hline 11 = 3w \\ \hline w = \frac{11}{3} \end{array}$$

3. Solve the equation. SHOW YOUR WORK!

a.  $9 = x + 12$

$$\begin{array}{r} 9 = x + 12 \\ -12 \quad -12 \\ \hline x = -3 \end{array}$$

b.  $3 \cdot 6 = \frac{x}{3} \cdot 3$

$$18 = x$$

c.  $-6x = 24$

$$\begin{array}{r} -6x = 24 \\ -6 \quad -6 \\ \hline x = -4 \end{array}$$

d.  $2(x - 4) - 8 = 3x$

$$\begin{array}{r} 2x - 8 - 8 = 3x \\ 2x - 16 = 3x \\ -2x \quad -2x \\ \hline -16 = x \end{array}$$

e.  $\frac{p+3}{2} = 7 + 2$

$$\begin{array}{r} 2 \cdot \frac{p+3}{2} = 9 \cdot 2 \\ p+3 = 18 \\ -3 \quad -3 \\ \hline p = 15 \end{array}$$

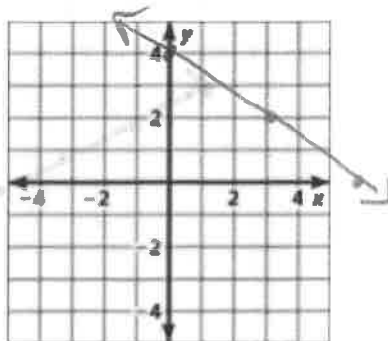
f.  $4y - 2(y + 4) = 22$

$$\begin{array}{r} 4y - 2y - 8 = 22 \\ 2y - 8 = 22 \\ +8 \quad +8 \\ \hline 2y = 30 \\ \hline y = 15 \end{array}$$

4. Given the following linear equations, identify the slope and the y-intercept. Finally graph

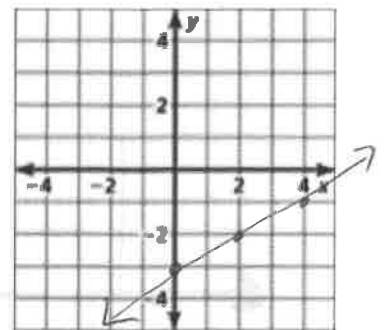
a.  $y = -\frac{2}{3}x + 4$

Slope  $-\frac{2}{3}$   
y-int  $4$



b.  $y = -3 + \frac{1}{2}x$

Slope  $\frac{1}{2}$   
y-int  $-3$





11. Tell whether the ordered pair is a solution to the system of linear equations. (Show WORK)

a)  $(2, -5)$ ;  $3x + 2y = -4 \rightarrow 3(2) + 2(-5) = -4$   
 $x + y = -3$   
 $2 - 5 = -3$   
 $-3 = -3 \checkmark$  **Yes**

b)  $(-2, 2)$ ;  $y = 2x + 6$   
 $2 = 2(-2) + 6$   
 $2 = -4 + 6$   
 $2 = 2 \checkmark$   
 $y = 3x + 9$   
 $2 = 3(-2) + 9$   
 $2 = -6 + 9$   
 $2 = 3 \times$  **No**

12. Solve the system by elimination. Answer: ordered pair  $(-1, 5)$

$$\begin{array}{r} 4x + 2y = 6 \\ 4x - 2y = -14 \\ \hline 8x = -8 \\ \frac{8}{8} = \frac{-8}{8} \\ \hline x = -1 \end{array}$$

$$\begin{array}{r} 4(-1) + 2y = 6 \\ -4 + 2y = 6 \\ +4 \quad +4 \\ \hline 2y = 10 \\ \frac{2y}{2} = \frac{10}{2} \\ y = 5 \end{array}$$

**$(-1, 5)$**

13. Solve the system by substitution. Answer: ordered pair  $(6, 14)$

$$\begin{array}{r} y = 3x - 4 \\ y = 2x + 2 \\ \hline 3x - 4 = 2x + 2 \\ -2x \quad -2x \\ \hline x - 4 = 2 \\ +4 \quad +4 \\ \hline x = 6 \end{array}$$

$$\begin{array}{r} y = 2(6) + 2 \\ 12 + 2 \\ \hline y = 14 \end{array}$$

14. Determine the number of solutions the following system of equations has - no solutions, infinite solutions or one solution. SHOW ALL WORK!

a.  $(-5x + y = -2) \times 4$   
 $20x - 4y = 8$   
 $-20x + 4y = -8$   
 $0 = 0$

**all sol / Infinite Sol**

b.  $(2x + y = -6) \times 2$   
 $-4x + y = 9$   
 $4x + 2y = -12$   
 $3y = -3$

**one sol**

c.  $-3x + 2y = 1$   
 $3x - 2y = -4$   
 $0 = -3$

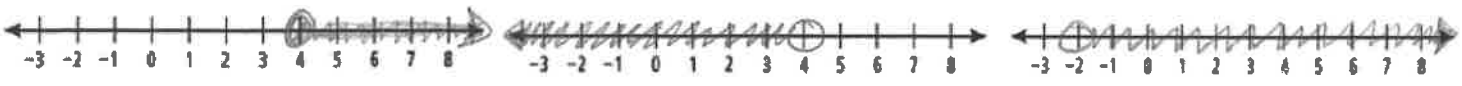
**No Sol**

15. Solve the inequality and Graph the solution.

a.  $-\frac{2x}{2} \leq -2x - 2$   
 $x \geq 4$

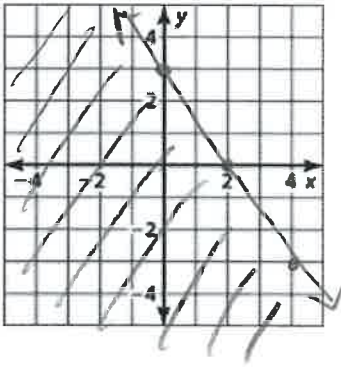
b.  $2(y - 3) + y < 6$   
 $2y - 6 + y < 6$   
 $3y - 6 < 6$   
 $+6 \quad +6$   
 $3y < 12$   
 $\frac{3y}{3} < \frac{12}{3} \quad y < 4$

c.  $-4 < 3k$   
 $-k \quad -k$   
 $-\frac{4}{2} < \frac{2k}{2}$   
 $-2 < k$   
 $k > -2$



16. Graph each inequality in the Cartesian Coordinate plane. Shade the proper half plane.

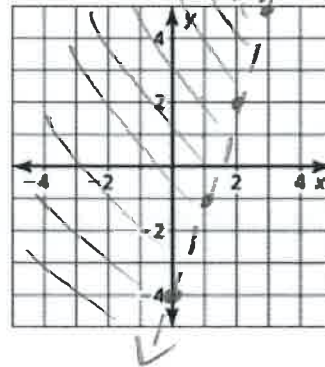
a.  $3x + 2y \leq 6$



$$3x + 2y \leq 6$$

$$\begin{array}{r} -3x \\ \hline 2y \leq -3x + 6 \\ \hline y \leq -\frac{3}{2}x + 3 \end{array}$$

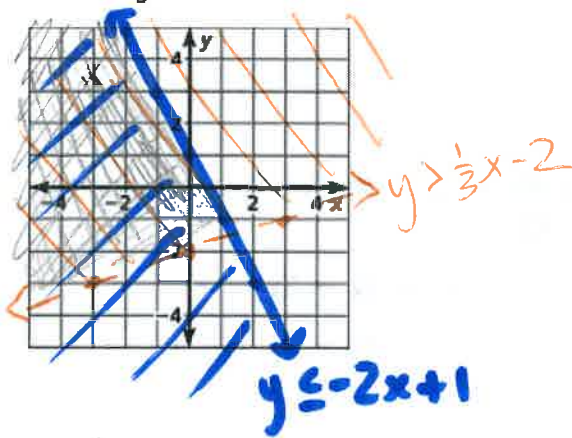
b.  $-3x + y > -4$



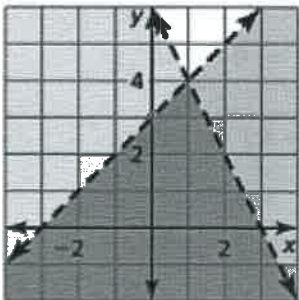
$$\begin{array}{r} -3x + y > -4 \\ +3x \quad +3x \\ \hline y > 3x - 4 \end{array}$$

17. Graph each system of inequalities in the Cartesian Coordinate plane. Shade the intersection.

a.  $y \leq -2x + 1$   
 $y > \frac{1}{3}x - 2$



18. Given the system of inequalities. Write the equation of each inequality.



Dashed line with a positive slope:  $y < x + 3$

Dashed line with a negative slope:  $y < -\frac{2}{3}x + 6$