

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. $4x - 6w = y$

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

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

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

$$w = \frac{11}{3}$$

3. Solve the equation. SHOW YOUR WORK!

a. $9 = x + 12$

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

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

$$18 = x$$

c. $\frac{-6x}{-6} = \frac{24}{-6}$

$$x = -4$$

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

$$2x - 8 - 8 = 3x$$

$$2x - 16 = 3x$$

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

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

$$2 \cdot \frac{p+3}{2} = 9 \cdot 2$$

$$p+3 = 18$$

$$\begin{array}{r} -3 \quad -3 \\ \hline p = 15 \end{array}$$

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

$$4y - 2y - 8 = 22$$

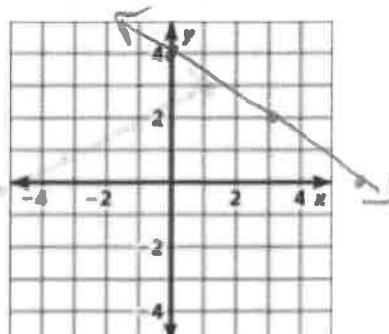
$$2y - 8 = 22$$

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

$$y = 15$$

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

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

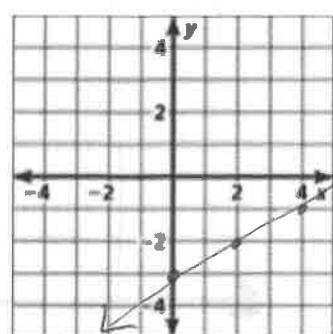


Slope $-\frac{2}{3}$

y-int 4

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

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

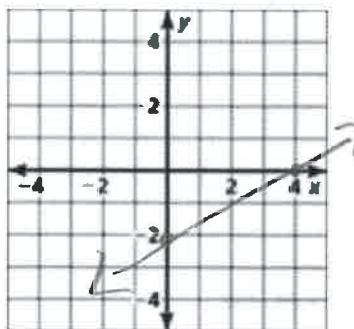


5. Find the x & y intercepts and graph

$$2x - 4y = 8$$

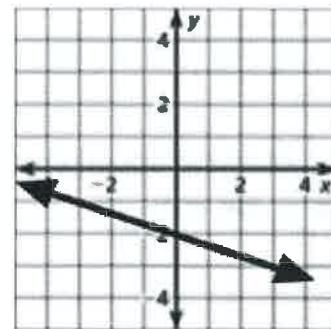
$$\frac{2x}{2} = \frac{8}{2}$$

$$x\text{-int } (4, 0) \quad y\text{-int } (0, -2)$$



6. Look at the graph below

x-intercept $(4, 0)$
 y-intercept $(0, -2)$
 Slope = $-1/3$



Given the slope and the y-intercept, find the equation of the line in slope-intercept form.

7. Slope = 0 & y-int = (0, -3)

$$y = 0x - 3 \text{ or } y = -3$$

8. Slope = $\frac{3}{4}$ & y-int = (0, 4)

$$y = \frac{3}{4}x + 4$$

9. The function $g(h) = -2h + 18$ represents the number of gallons g that remain in the car's gas tank after h hours of traveling at 70 mph.

a) How large is the gas tank? 18 gallons

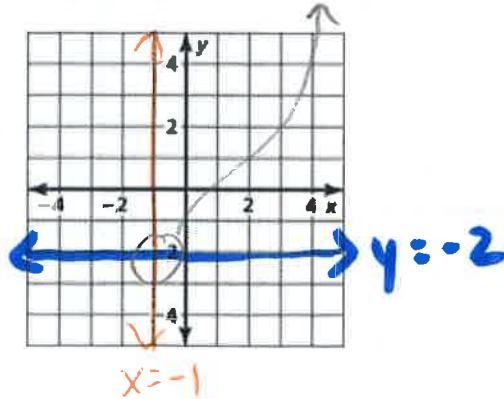
b) How many gallons are left in the tank after 3 hours? 12 gallons

c) In how many hours will the tank be empty? 9 hours

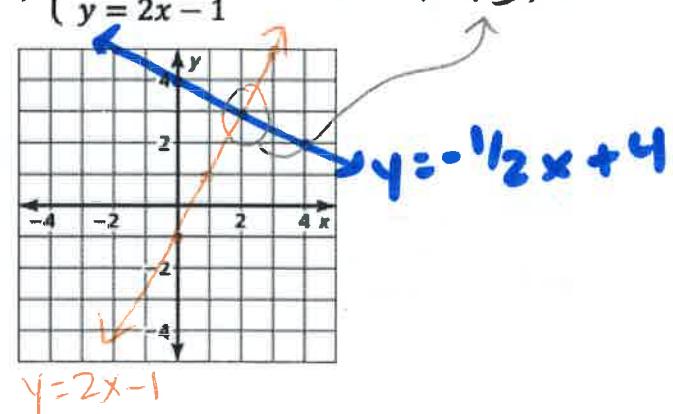
d) How many gallons per hour does the car use? 2 gallons per hour

10. Solve the system by graphing. Answer as an ordered pair (,)

a) $\begin{cases} y = -2 \\ x = -1 \end{cases}$



b) $\begin{cases} y = -\frac{1}{2}x + 4 \\ y = 2x - 1 \end{cases}$



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

a) $(2, -5)$; $3x + 2y = -4 \rightarrow 3(2) + 2(-5) = -4$ b) $(-2, 2)$; $y = 2x + 6$

$$\begin{array}{l} x + y = -3 \\ 2 - 5 = -3 \\ -3 = -3 \end{array}$$

$$\begin{array}{l} 6 - 10 = -4 \\ -4 = -4 \end{array}$$

YES **NO**

$$\begin{array}{l} 2 = 2(-2) + 6 \\ 2 = -4 + 6 \\ 2 = 2 \end{array}$$

$$\begin{array}{l} 2 = 3(-2) + 9 \\ 2 = -6 + 9 \\ 2 = 3 \end{array}$$

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

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

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

(-1, 5)

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

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

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

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

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

$$\begin{array}{l} 20x - 4y = 8 \\ -20x + 4y = -8 \\ \hline 0 = 0 \end{array}$$

all sol / Infinite Sol

b. $(2x + y = -6) \times 2$

$$\begin{array}{l} -4x + y = 9 \\ 4x + 2y = -12 \\ \hline 3y = -3 \\ y = -1 \end{array}$$

One Sol

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

$$\begin{array}{l} 3x - 2y = -4 \\ \hline 0 = -3 \end{array}$$

NO SOL

15. Solve the inequality and Graph the solution.

a. $\frac{-2x}{2} \leq -2 \times -2$

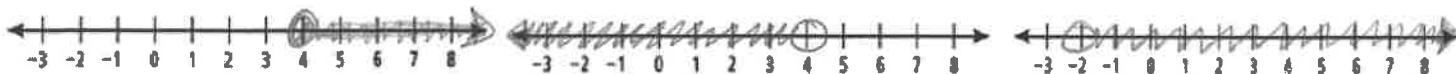
$$x \geq 4$$

b. $2(y - 3) + y < 6$

$$\begin{array}{l} 2y - 6 + y < 6 \\ 3y - 6 < 6 \\ +6 \quad +6 \\ \hline \frac{3y}{3} < \frac{12}{3} \\ y < 4 \end{array}$$

c. $k - 4 < 3k$

$$\begin{array}{l} -k \quad -k \\ \hline -4 < 2k \\ \frac{-4}{2} < \frac{2k}{2} \\ -2 < k \\ k > -2 \end{array}$$



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

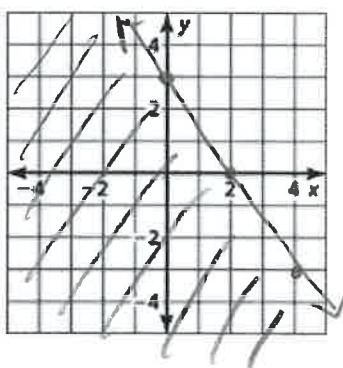
$$3x + 2y \leq 6$$

$$-3x$$

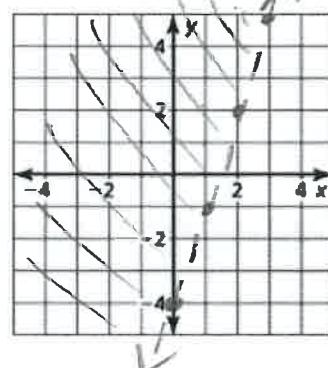
$$\frac{2y}{2} \leq -3x + 6$$

$$y \leq -\frac{3}{2}x + 3$$

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



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



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

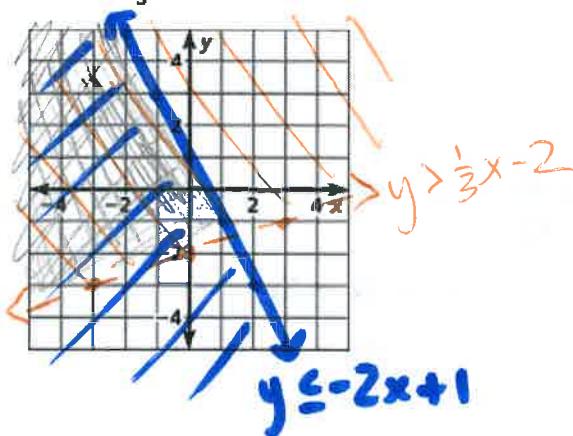
$$+3x$$

$$y > 3x - 4$$

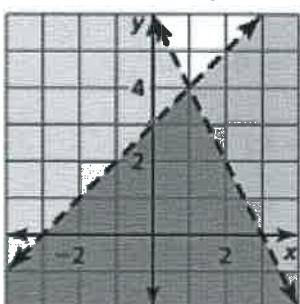
17. Graph each system of inequalities in the Cartesian Coordinate plane. Shade the intersection.

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: $y < 1x + 3$

Dashed line with a negative slope: $y < -\frac{2}{1}x + 6$