

# ALGEBRA 2

-2 48/50

Great Quiz!

1) Fill in the blanks: A **System of Linear Equations** is two or more variables in two or more equations. A **solution** to a **System of Linear Equations** is an ordered pair that solves each equation in a system. (3 pts.)

2) State with a **YES** or **NO** whether the ordered pair is a solution of the linear system. (2 pts.)

$$\begin{cases} 4x + y = 3 \\ 10x + 2y = 2 \end{cases} \quad (-2, 11)$$

Yes

3) Solve the System of Linear Equations by **graphing**. State the solution in the space provided. (4 pts.)

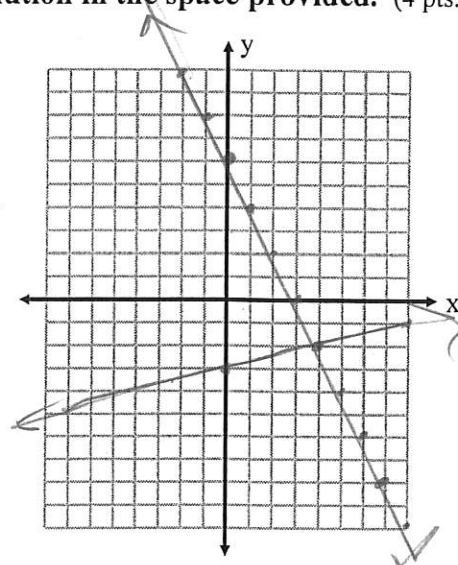
$$\begin{cases} 2x + y = 6 \\ -x + 4y = -12 \end{cases}$$

$$y = -2x + 6$$

$$4y = x - 12$$

$$y = \frac{1}{4}x - 3$$

(4, -2)



For #4, Graph each equation to find the break-even point. Answer the question below. (4 pts.)

4) A manufacturer of cell phones has cost and revenue equations given below. How many cell phones,  $x$ , must be produced and sold for the manufacturer to break-even?

Cost Equation:  $y = 20x + 10,000$

Revenue Equation:  $y = 40x$

Cost:

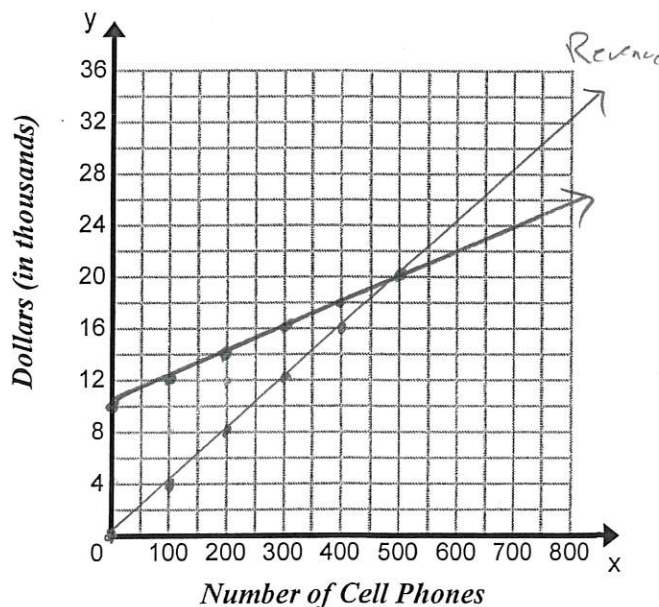
| x   | y     |
|-----|-------|
| 0   | 10000 |
| 100 | 12000 |
| 200 | 14000 |
| 300 | 16000 |

500 20000

Revenue:

| x   | y     |
|-----|-------|
| 0   | 0     |
| 100 | 4000  |
| 200 | 8000  |
| 300 | 12000 |

500 20000



They break even at 500 cell-phones

5) (a) Write each equation in slope-intercept form.

(b) State whether the system has one solution, no solution, or infinitely many solutions.

(c) Classify the system as Consistent/Independent, Inconsistent, or Consistent/Dependent. (4 pts.)

$$\begin{cases} 4x - 3y = -3 \\ -3y = -4x - 3 \end{cases} \quad y = \frac{4}{3}x + 1 \quad \text{b) } \underline{\text{Infinitely Many Solutions}}$$

$$\begin{cases} 0 = 8x - 6y + 6 \\ 6y = 8x + 6 \end{cases} \quad y = \frac{4}{3}x + 1 \quad \text{c) } \underline{\text{Consistent/Dependent}}$$

For #6 & 7, Solve each System of Linear Equations using any algebraic method. (4 pts. each)

$$\begin{aligned} \text{6) } \begin{cases} 3x + y = 1 \\ x - 2y = 12 \end{cases} & \quad (2, -5) \\ y = -3x + 1 & \\ x - 2(-3x + 1) = 12 & \\ x + 6x - 2 = 12 & \\ 7x = 14 & \\ x = 2 & \end{aligned} \quad \begin{aligned} \text{7) } \begin{cases} 3x - 2y = 6 \\ 5x + 3y = -9 \end{cases} & \quad (0, -3) \\ 9x - 6y = 18 & \\ 10x + 6y = -18 & \\ 1x + 0y = 0 & \\ x = 0 & \\ 0 - 2y = 6 & \\ y = -3 & \end{aligned}$$

For #8 & 9, (a) Define your variables, (Except for #9, where you use the given variables and a table.)

(b) Write the System of Equations, (c) Solve the System, and

(d) Answer the Question in a complete sentence. (6 pts. each)

8) A dealer carries two models of DVD players, basic and deluxe. The deluxe model sells for \$300 and the basic model sells for \$225. The dealer sells 22 total DVD players for a combined sale of \$5,700. How many of each type did the dealer sell?

$$\begin{aligned} \text{a) } x &= \underline{\text{Num Basic}} \\ y &= \underline{\text{Num Deluxe}} \end{aligned} \quad \text{b) } \begin{cases} x + y = 22 \\ 225x + 300y = 5700 \end{cases}$$

$$\begin{aligned} \text{c) } y &= -x + 22 \\ 225x + 300(-x + 22) &= 5700 \\ 225x - 300x + 6600 &= 5700 \\ -75x &= -900 \quad x = 12 \end{aligned}$$

$$\boxed{(12, 10)}$$

d) They sold 12 basic players and 10 deluxe.

- 9) One metal compound is 50% silver, and another is 20% silver. Determine how much of each is needed to make 100 kilograms of an alloy that is 44% silver.

a)  $x =$  Amount of 50% silver alloy  
 $y =$  Amount of 20% silver alloy

|                  | Percent silver | ×<br>Number of kg in alloy | = kg of silver in alloy |
|------------------|----------------|----------------------------|-------------------------|
| 50% silver alloy | 0.5            | $x$                        | $0.5x$                  |
| 20% silver alloy | 0.2            | $y$                        | $0.2y$                  |
| 44% silver alloy | 0.44           | 100                        | 44                      |

b) 
$$\begin{cases} x + y = 100 \\ 0.5x + 0.2y = 44 \end{cases}$$

$$y = -x + 100$$

$$0.5x + 0.2(-x + 100)$$

$$0.5x - 0.2x + 20 = 44$$

$$0.3x = 24$$

$(80, 20)$

d) They need 80 kg 50% alloy and 20 kg 20% alloy.

- 10) State with a YES or NO whether the ordered pair is a solution of the given System of Linear Inequalities. (2 pts.)

$$\begin{cases} x + 5y < 3 \\ -2x + y > 4 \end{cases}$$

a)  $(-8, 2)$

Yes

b)  $(-3, -1)$

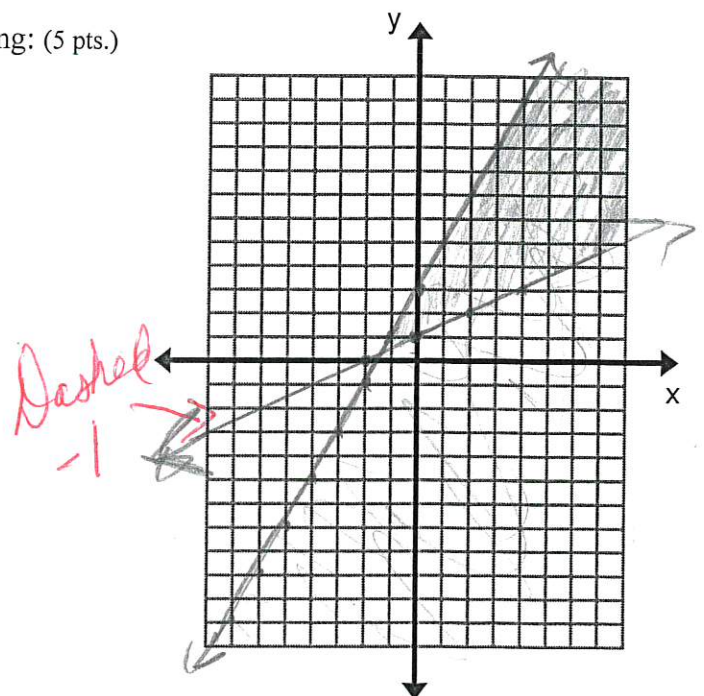
Yes

- 11) Solve the System of Linear Inequalities by graphing: (5 pts.)

$$\begin{cases} y \leq 2x + 3 \\ x - 2y < -2 \end{cases}$$

$$-2y = -x - 2$$

$$y = \frac{1}{2}x + 1$$





12) **Sketch** the graph of the constraint inequalities. State the vertices.

Then find the **minimum** and **maximum** values of the objective quantity. (7 pts.)

**Objective Quantity:**  $R(x, y) = 4x + 2y + 7$

**Constraints:**

$$\begin{cases} x \geq -4 \\ x + 2y \leq 8 \\ y \geq x + 1 \end{cases}$$

$$2y = -x + 8$$

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

$$y = x + 1$$

Vertices:

$$(2, 3) \quad (-4, -3) \quad (-4, 6)$$

Minimum:  $-15$  @  $(-4, -3)$

Maximum:  $21$  @  $(2, 3)$

$$R(2, 3) = 4(2) + 2(3) + 7$$

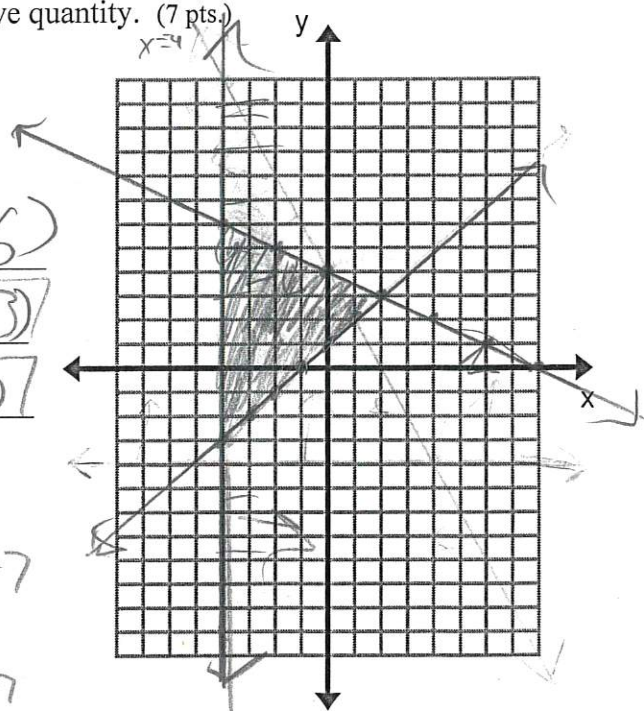
$$21 = 8 + 6 + 7$$

$$R(-4, -3) = 4(-4) + 2(-3) + 7$$

$$-15 = -16 - 6 + 7$$

$$R(-4, 6) = 4(-4) + 2(6) + 7$$

$$3 = -16 + 12 + 7$$



**Extra Credit: Worth 3 points.**

#1) Solve by any method: 
$$\begin{cases} 8x + 3y = -11 \\ -\frac{1}{3}x - \frac{1}{2}y = \frac{7}{3} \end{cases}$$

$$\left( \frac{5}{6}, -\frac{13}{9} \right) \checkmark$$

$$x = -0.8\bar{3}$$

$$y = -1.\bar{4}$$

-0