

Name: Key

Class: \_\_\_\_\_

M8-U5: Notes & HW #8 – Practice Solving Systems

Date: \_\_\_\_\_

Solve the following systems algebraically, find the solution.

$$1. \begin{cases} -2x + y = -12 \\ -x + y = -5 \end{cases} \rightarrow \begin{array}{r} -2x + y = -12 \\ +x - y = 5 \\ \hline -x = -7 \\ \frac{-x}{-1} = \frac{-7}{-1} \\ \boxed{x = 7} \end{array}$$

$$\begin{array}{r} -(7) + y = -5 \\ +7 \quad +7 \\ \hline \boxed{y = 2} \end{array}$$

$P(7, 2)$

ck

$$\begin{array}{l} -2(7) + (2) \stackrel{?}{=} -12 \\ -14 + 2 \stackrel{?}{=} -12 \\ -12 = -12 \checkmark \end{array}$$

$$2. \begin{cases} x + y = 3 \\ -x + y = 9 \end{cases} \rightarrow \begin{array}{r} x + y = 3 \\ -x + y = 9 \\ \hline 2y = 12 \\ \frac{2y}{2} = \frac{12}{2} \\ \boxed{y = 6} \\ x + (6) = 3 \\ -6 \quad -6 \\ \hline \boxed{x = -3} \end{array}$$

$P(-3, 6)$

ck

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

$$3. \begin{cases} y = x \\ y = -x + 2 \end{cases}$$

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

$\boxed{x = 1}$

$\boxed{y = 1}$

$P(1, 1)$

ck

$$\begin{array}{l} (1) \stackrel{?}{=} -(1) + 2 \\ 1 = 1 \checkmark \end{array}$$

$$4. \begin{cases} 2x + y = 2 \\ y = 3x + 2 \end{cases}$$

$$\begin{array}{r} 2x + 3x + 2 = 2 \\ -2 \quad -2 \\ \hline 5x = 0 \\ \boxed{x = 0} \end{array}$$

$$y = 3(0) + 2$$

$\boxed{y = 2}$

$P(0, 2)$

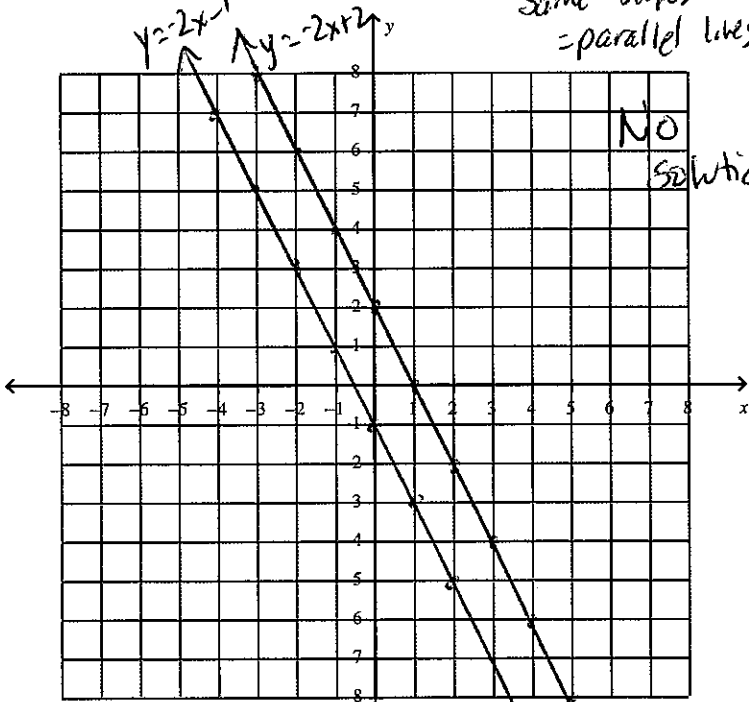
ck

$$\begin{array}{l} 2(0) + (2) \stackrel{?}{=} 2 \\ 2 = 2 \checkmark \end{array}$$

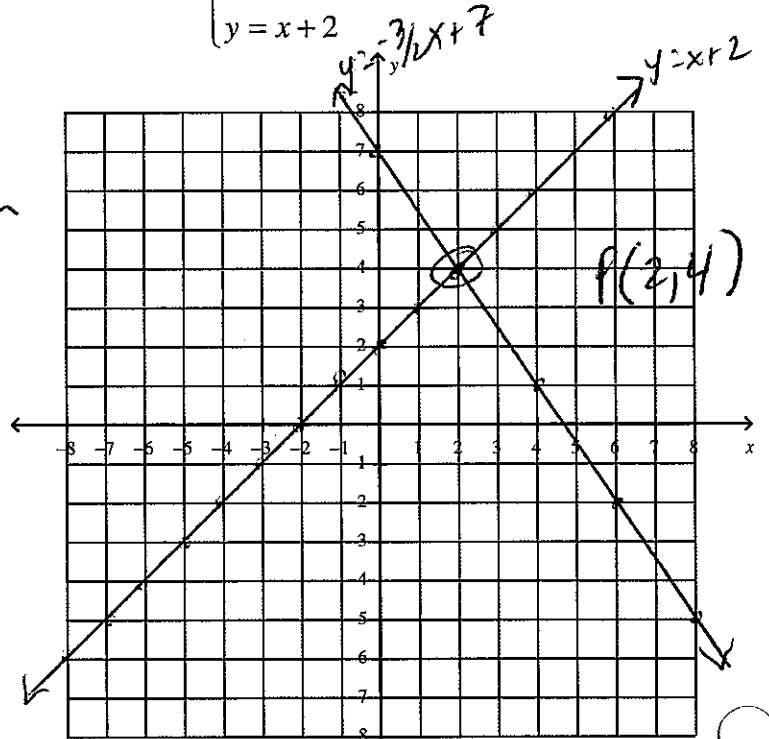
Find the solution to the following systems graphically.

5. 
$$\begin{cases} y = -2x + 2 \\ y = -2x - 1 \end{cases}$$

Same slopes  
= parallel lines

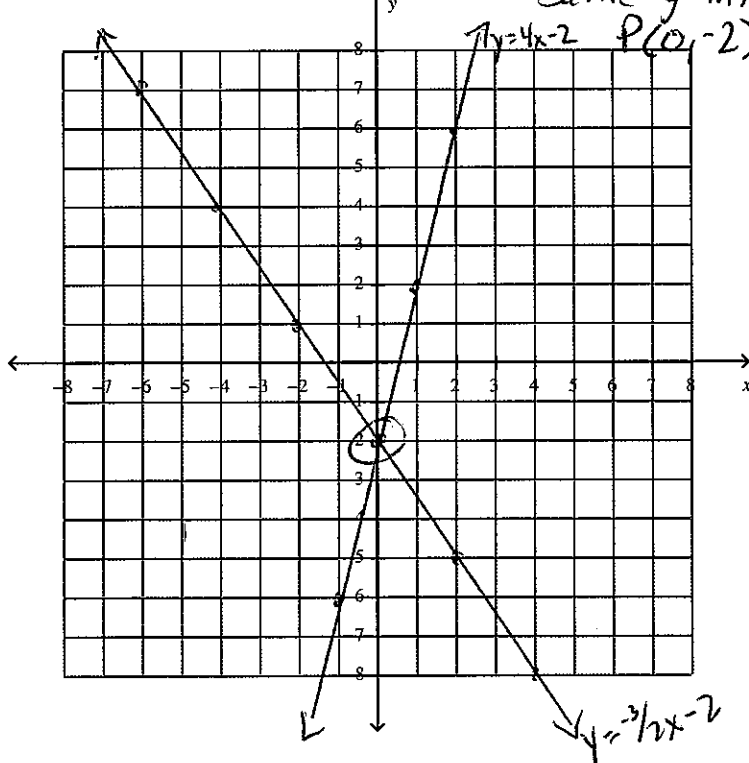


6. 
$$\begin{cases} y = -\frac{3}{2}x + 7 \\ y = x + 2 \end{cases}$$



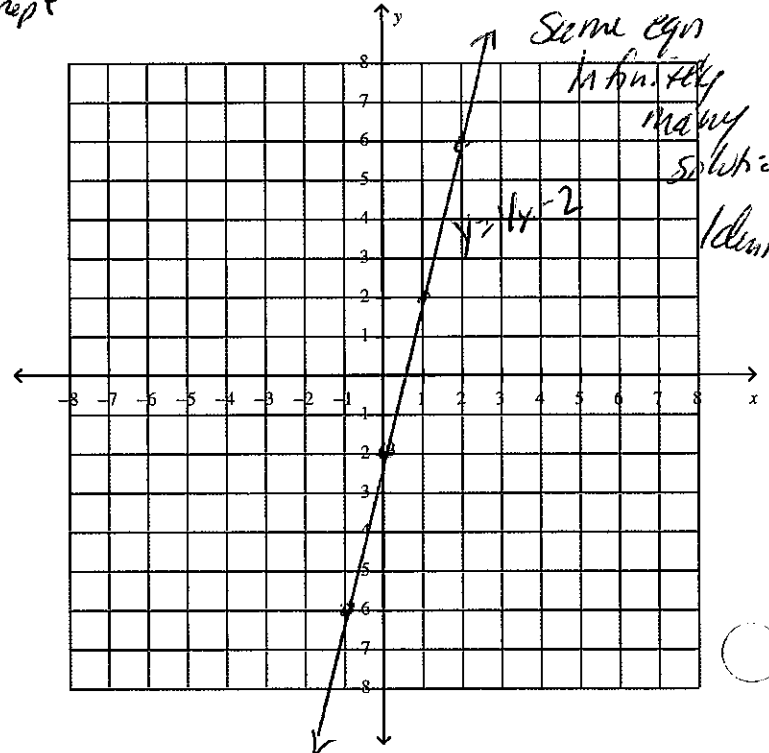
7. 
$$\begin{cases} \frac{3}{2}x + y = -2 \rightarrow y = -\frac{3}{2}x - 2 \\ y = 4x - 2 \end{cases}$$

Same y-intercept  
 $P(0, -2)$



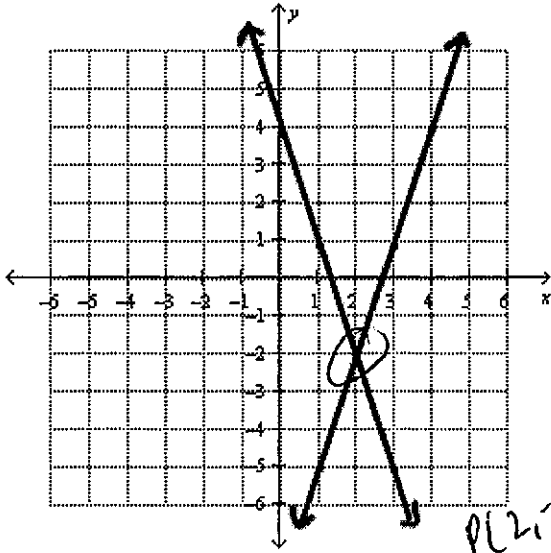
8. 
$$\begin{cases} y = 4x - 2 \\ -4x + y = -2 \rightarrow y = 4x - 2 \end{cases}$$

Same eqn  
Infinitely many solutions  
Identity



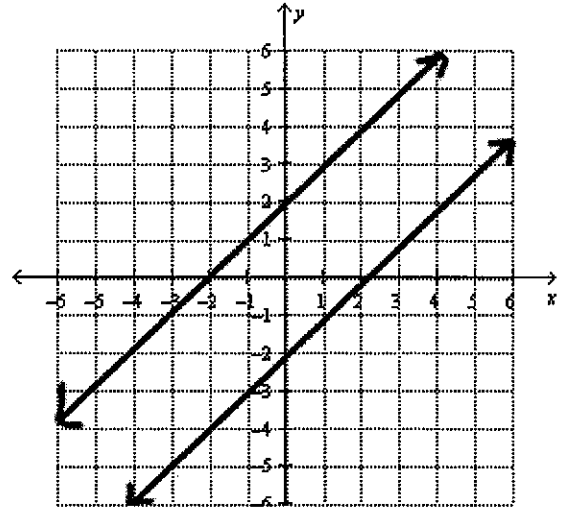
What is the solution of the system of linear equations graphed below?

9.



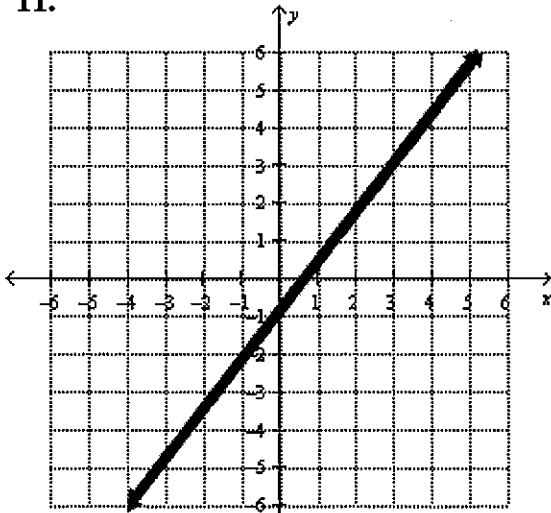
$P(2, -2)$

10.



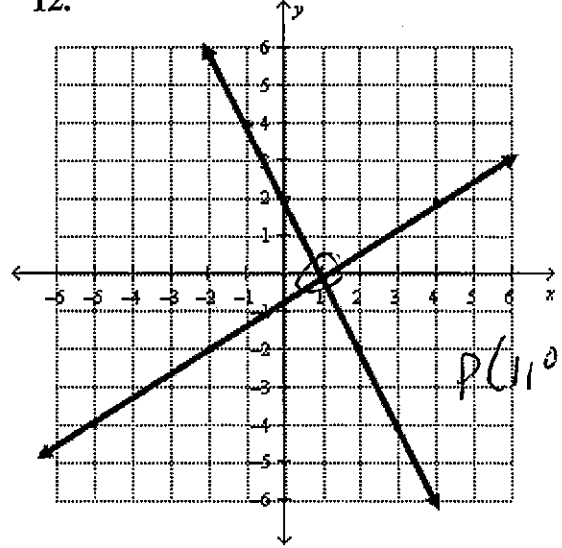
No solutions  
parallel lines

11.



Identity,  
Infinitely many  
solutions  
- same eqns.

12.



$P(1, 0)$

13. Sam is planning a ski trip and wants to figure out which mountain offers the best deal. Sam needs to rent skis and buy a lift ticket. He researched his options, and he found the following two packages which include ski rental and lift ticket:

<u>Zippity Ski</u> <u>Slopes Rental</u> <u>Package</u>
\$5 +
\$ 5 per hour for rental

<u>Cruising Ski</u> <u>Slopes Rental</u> <u>Package</u>
\$20 +
\$ 2 per hour for rental

Under what circumstances are the costs for the ski packages the same, and what will that cost be?

let:  $y = \text{cost} = \$30$   
 $h = \# \text{ of hours} = 5$

$$\begin{cases} y = 5h + 5 \\ y = 2h + 20 \end{cases}$$

$$\begin{array}{r} 2h + 20 = 5h + 5 \\ -2h \quad -5 \quad -2h - 5 \\ \hline 15 = 3h \\ \frac{15}{3} = \frac{3h}{3} \\ \boxed{5 = h} \end{array}$$

$$\begin{aligned} y &= 5(5) + 5 \\ &= 25 + 5 \\ &= \$30 \end{aligned}$$

$$\begin{aligned} y &= 2(5) + 20 \\ &= 10 + 20 \\ &= \$30 \end{aligned}$$

14. Marcello is an artist who makes oil paintings and charcoal sketches. He sells each oil painting for \$500 and each charcoal sketch for \$300. If Marcello wants to create 56 works in total, how many pieces of artwork must he sell in order to make exactly \$20,000?

let:  $p = \# \text{ oil paintings} = 16$   
 $c = \# \text{ of charcoal sketches} = 40$

$$\begin{cases} 500p + 300c = 20,000 \\ p + c = 56 \end{cases}$$

$$500p + 300c = 20,000$$

$$\rightarrow -300p - 300c = -16,800$$

$$\begin{array}{r} 200p = 3,200 \\ \frac{200}{200} \quad \frac{3,200}{200} \end{array}$$

$$\boxed{p = 16}$$

$$\begin{array}{r} (16) + c = 56 \\ -16 \quad -16 \\ \hline \boxed{c = 40} \end{array}$$

ck  
 $500(16) + 300(40) = 20,000$   
 $8,000 + 12,000 = 20,000$   
 $20,000 = 20,000$

Spiral:

Solve the equation and check your solution.

1.  $-7x - 13 = 15$

$$\begin{array}{r} +13 \quad +13 \\ \hline -7x = 28 \\ \div -7 \quad \div -7 \end{array}$$

$x = -4$

ck  $x = -4$   
 $-7(-4) - 13 = 15$   
 $28 - 13 = 15$   
 $15 = 15 \checkmark$

2.  $-4 - 6x = -22$

$$\begin{array}{r} +4 \quad +4 \\ \hline -6x = -18 \\ \div -6 \quad \div -6 \end{array}$$

$x = 3$

ck  $x = 3$   
 $-4 - 6(3) = -22$   
 $-4 - 18 = -22$   
 $-22 = -22 \checkmark$

Find the value of y when  $x = -2$ .

3.  $3x - 2y = 10$

$$\begin{array}{r} 3(-2) - 2y = 10 \\ -6 - 2y = 10 \\ +6 \quad +6 \\ \hline -2y = 16 \\ \div -2 \quad \div -2 \end{array}$$

$y = -8$

4.  $3 = 2x - y$

$$\begin{array}{r} 3 = 2(-2) - y \\ +4 \quad +4 \\ \hline +7 = -y \\ \div -1 \quad \div -1 \end{array}$$

$-7 = y$

Calculate the y-value for the given x-value.

5.  $y = \frac{1}{2}x - 4$  when  $x = 24$

$$\begin{array}{l} y = \frac{1}{2}(24) - 4 \\ y = 12 - 4 \\ \boxed{y = 8} \end{array}$$

6.  $y = -5x - 7$  when  $x = \frac{3}{5}$

$$\begin{array}{l} y = -5\left(\frac{3}{5}\right) - 7 \\ y = -1 - 7 \\ \boxed{y = -8} \end{array}$$

7.  $y = \frac{2}{3}x - 12$  when  $x = -18$

$$\begin{array}{l} y = \frac{2}{3}(-18) - 12 \\ y = -12 - 12 \\ \boxed{y = -24} \end{array}$$

8.  $y = -\frac{1}{4}x - \frac{3}{4}$  when  $x = -6$

$$\begin{array}{l} y = -\frac{1}{4}(-6) - \frac{3}{4} \\ y = \frac{6}{4} - \frac{3}{4} \\ \boxed{y = \frac{3}{4}} \end{array}$$

Write an equation for the line satisfying the given conditions.

9. passes through  $(4, 0)$  and  $(0, 3)$

$$\begin{array}{c|c} x & y \\ \hline 4 & 0 \\ 0 & 3 \end{array}$$

$$m = \frac{\Delta y}{\Delta x} = \frac{3}{-4}$$

$$b = (0, 3)$$

$$y = mx + b$$

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

10. slope =  $\frac{2}{3}$ , passing through the point  $(3, 4)$

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

$$4 = \frac{2}{3}(3) + b$$

$$4 = 2 + b$$

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

$$2 = b$$

$$y = \frac{2}{3}x + 2$$

11. passes through the points  $(5, 4)$  and  $(1, 7)$

$$\begin{array}{c|c} x & y \\ \hline 5 & 4 \\ 1 & 7 \end{array}$$

$$m = \frac{\Delta y}{\Delta x} = \frac{3}{-4}$$

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

$$7 = -\frac{3}{4}(1) + b$$

$$7 = -\frac{3}{4} + b$$

$$\begin{array}{r} +\frac{3}{4} \quad +\frac{3}{4} \\ \hline \end{array}$$

$$7\frac{3}{4} = b$$

$$y = -\frac{3}{4}x + 7\frac{3}{4}$$