

# Chapter 7 Review

Sections 7.1 – 7.4

Solving Systems of Equations

# #1

Graph and check to solve the linear system.

move  
down 1  
Right 1

$$y = -x + 6 \quad \text{begin}$$

(4, 2)

move  
up 2  
Right 1

$$y = 2x - 6$$

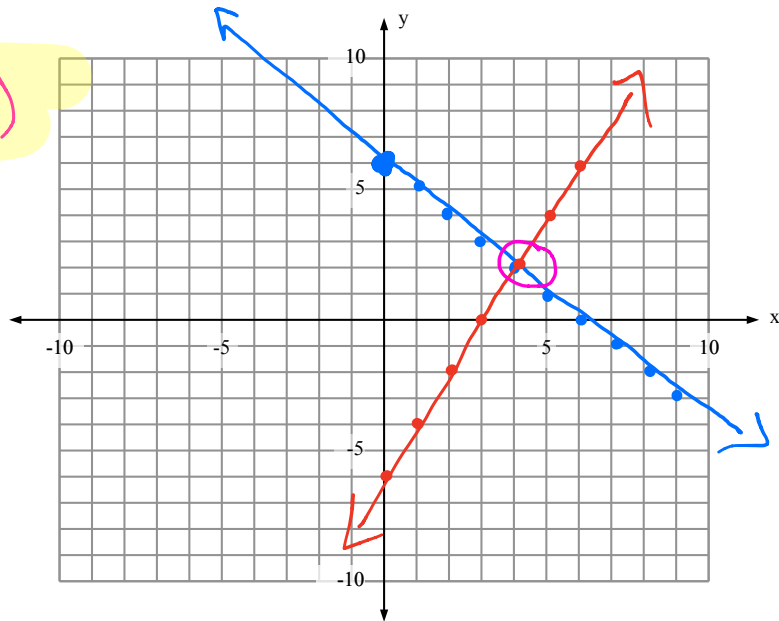
$$2 = -(4) + 6$$

$$2 = 2 \quad \checkmark$$

$$2 = 2(4) - 6$$

$$2 = 8 - 6$$

$$2 = 2 \quad \checkmark$$



# #2

Graph and check to solve the linear system.

$(-4, 3)$

Up 1

Right 2

$$y = \frac{1}{2}x + 5$$

Down 1

Right 2

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

CHECK:  $3 = \frac{1}{2}(-4) + 5$

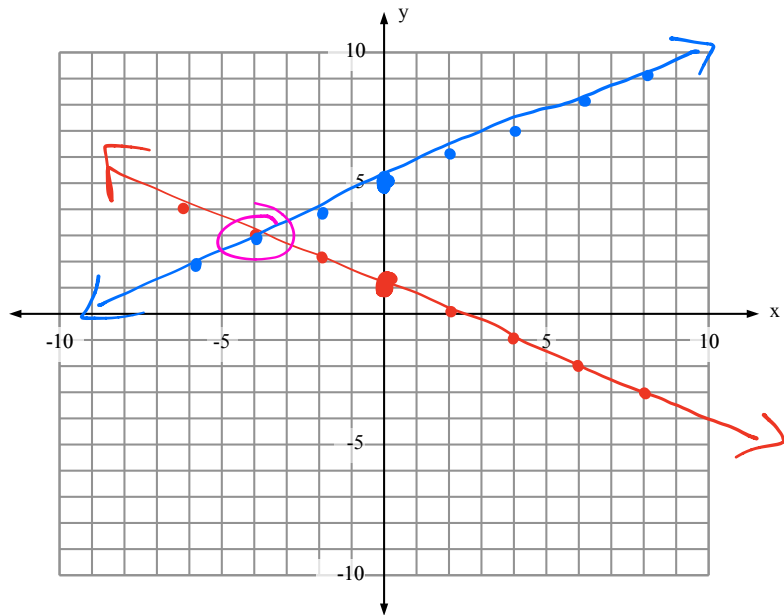
$$3 = -2 + 5$$

$$3 = 3 \quad \checkmark$$

$$3 = -\frac{1}{2}(-4) + 1$$

$$3 = 2 + 1$$

$$3 = 3 \quad \checkmark$$



# #3

Use the substitution method to solve the linear system.  $(6, 2)$

$$4x + y = 26$$

$$y = x - 4$$

$$y = (6) - 4$$
$$y = 2$$

$$4x + (x - 4) = 26$$
$$4x + x - 4 = 26$$
$$5x - 4 = 26$$
$$\begin{array}{r} 5x - 4 = 26 \\ +4 \quad +4 \\ \hline 5x = 30 \\ \frac{5x}{5} = \frac{30}{5} \\ x = 6 \end{array}$$

$$4(6) + (2) = 26$$
$$24 + 2 = 26$$
$$26 = 26 \checkmark$$

$$(2) = (6) - 4$$
$$2 = 2 \checkmark$$

# #4

Use the substitution method to solve the linear system.  $(0, 3)$

$$x = 9 - 3y$$
$$4x - 2y = -6$$

$$x = 9 - 3(3)$$

$$x = 9 - 9$$

$$x = 0$$

$$4(9 - 3y) - 2y = -6$$
$$36 - 12y - 2y = -6$$
$$\cancel{36} - 14y = -6$$
$$\hline -14y = -42$$
$$\cancel{-14} \quad \quad \quad \cancel{-14}$$
$$y = 3$$

$$4(0) - 2(3) = -6$$
$$0 - 6 = -6$$
$$-6 = -6 \checkmark$$

$$0 = 9 - 3(3)$$
$$0 = 9 - 9$$
$$0 = 0 \checkmark$$

# #5

Use the substitution method to solve the linear system.

$$(-9, 5)$$

$$3y - 24 = x$$

$$5x + 8y = -5$$

$$x = 3(5) - 24$$

$$x = 15 - 24$$

$$x = -9$$

$$5(3y - 24) + 8y = -5$$

$$15y - 120 + 8y = -5$$

$$23y - 120 = -5$$

$$\frac{23y}{23} = \frac{115}{23}$$

$$y = 5$$

$$3(5) - 24 = (-9)$$
$$15 - 24$$
$$-9 = -9 \checkmark$$

$$5(-9) + 8(5) = -5$$
$$-45 + 40$$
$$-5 = -5 \checkmark$$

# #6

Use the substitution method to solve the linear system.

$$(4, 2)$$

$$y = 2x - 6$$

$$2x - 3y = 2$$

$$y = 2(4) - 6$$

$$y = 8 - 6$$

$$y = 2$$

$$2x - 3(2x - 6) = 2$$

$$2x - 6x + 18 = 2$$

$$-4x + 18 = 2$$

$$\frac{-4x}{-4} = \frac{-16}{-4}$$

$$x = 4$$

$$2(2) = 2(4) - 6$$

$$= 8 - 6$$

$$2 = 2 \checkmark$$

$$2(4) - 3(2) = 2$$

$$8 - 6$$

$$2 = 2 \checkmark$$

# #7

Use elimination to solve the linear system.  $(3, 1)$

$$\begin{array}{r} 3x + y = 10 \rightarrow 3x + y = 10 \\ x + 5y = 8 \rightarrow -3x - 15y = -24 \\ \hline -14y = -14 \\ \frac{-14y}{-14} = \frac{-14}{-14} \end{array}$$

$$\begin{array}{r} x + 5(1) = 8 \\ x + 5 = 8 \\ \underline{-5 \quad -5} \\ x = 3 \end{array}$$

$$y = 1$$

$$\begin{array}{r} 3(3) + (1) = 10 \\ 9 + 1 \\ 10 = 10 \checkmark \end{array}$$

$$\begin{array}{r} (3) + 5(1) = 8 \\ 3 + 5 \\ 8 = 8 \checkmark \end{array}$$



# #8

Use elimination to solve the linear system.  $(10, 2)$

$$\begin{array}{r} 4x - 30y = -20 \\ + \quad -4x + 5y = -30 \\ \hline \end{array}$$
$$\frac{-25y = -50}{-25} \quad \frac{-25}{-25}$$
$$y = 2$$

$$\begin{array}{r} -4x + 5(2) = -30 \\ -4x + 10 = -30 \\ \hline -4x = -40 \\ \hline -4 \quad \quad \quad -4 \end{array}$$

$$x = 10$$

$$\begin{array}{r} 4(10) - 30(2) = -20 \\ 40 - 60 \\ -20 = -20 \end{array}$$

$$\begin{array}{r} -4(10) + 5(2) = -30 \\ -40 + 10 = -30 \\ -30 = -30 \end{array}$$

# #9

Tough

Use elimination to solve the linear system.  $(-2, 5)$

$$\begin{array}{r} 15 \cdot -3 \\ 5x + 4y = 10 \end{array} \rightarrow \begin{array}{r} -15x - 12y = -30 \\ \hline 3x + 3y = 9 \end{array} \rightarrow \begin{array}{r} -15x - 12y = -30 \\ +15x + 15y = 45 \\ \hline 3y = 15 \\ \hline y = 5 \end{array}$$

$$\begin{array}{r} 3x + 3(5) = 9 \\ 3x + 15 = 9 \\ -15 \quad -15 \\ \hline 3x = -6 \\ \hline x = -2 \end{array}$$

Check:

$$\begin{array}{r} 5(-2) + 4(5) = 10 \\ -10 + 20 \\ 10 = 10 \checkmark \end{array}$$

$$\begin{array}{r} 3(-2) + 3(5) = 9 \\ -6 + 15 \\ 9 = 9 \checkmark \end{array}$$

# #10

In early spring, you buy 6 potted tomato plants for your garden. The 8-inch potted plants sell for \$5 and the 10-inch potted plants sell for \$8. If you spend \$36, how many of each size are you buying?

*x* = 8 in. plants  
*y* = 10 in. plants

*y* = 2 10-in. plants  
*x* = 4 8-in. plants

*x* + 2 = 6  
*x* = 4

# of plants	$x + y = 6$	$-5x - 5y = -30$
\$	$5x + 8y = 36$	$+5x + 8y = 36$
		$3y = 6$
		$y = 2$

# #11

A store sold 28 pairs of cross-trainer shoes for a total of \$2220. Nike shoes sold for \$70 per pair and Adidas shoes sold for \$90 per pair. How many of each style were sold?

$$\begin{array}{r} \begin{array}{l} N + A = 28 \\ 70N + 90A = 2220 \end{array} \quad \begin{array}{l} \xrightarrow{-70} \\ \xrightarrow{-70} \end{array} \quad \begin{array}{l} \cancel{70N} - 70A = -1960 \\ +70N + 90A = 2220 \end{array} \end{array}$$

$N = \text{Nike}$   
 $A = \text{Adidas}$

$$N + 13 = 28$$

$$N = 15$$

15 Nike shoes  
13 Adidas shoes

$$\begin{array}{r} 20A = 260 \\ \hline 20 \quad 20 \end{array}$$

$$A = 13$$

# #12

Solve the linear system and tell how many solutions the linear system has.

*Elimination*

$$\begin{array}{r} 2x - 3y = 1 \\ + \quad -2x + 3y = 1 \\ \hline \end{array}$$

$0 \neq 2$  NOT TRUE

No Solution

# #13

Solve the linear system and tell how many solutions the linear system has.

$$\begin{array}{l} 3x + y = -1 \\ -9x - 3y = 3 \end{array} \quad \begin{array}{l} \xrightarrow{\cdot 3} \\ \xrightarrow{\cdot 3} \end{array} \quad \begin{array}{l} \boxed{\cancel{9x} + 3y = -3} \\ \boxed{\cancel{-9x} - 3y = 3} \end{array}$$

$$0 = 0 \quad \text{TRUE}$$

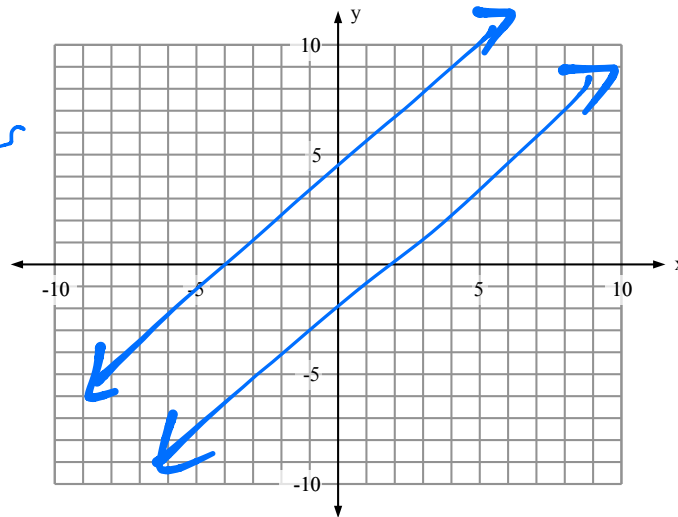
INFINITELY MANY  
SOLUTIONS

# #14

Describe what the lines would look like if there is **no solution** to the system of equations.

No Solution means the lines NEVER touch.

Parallel lines.  
Same slopes.

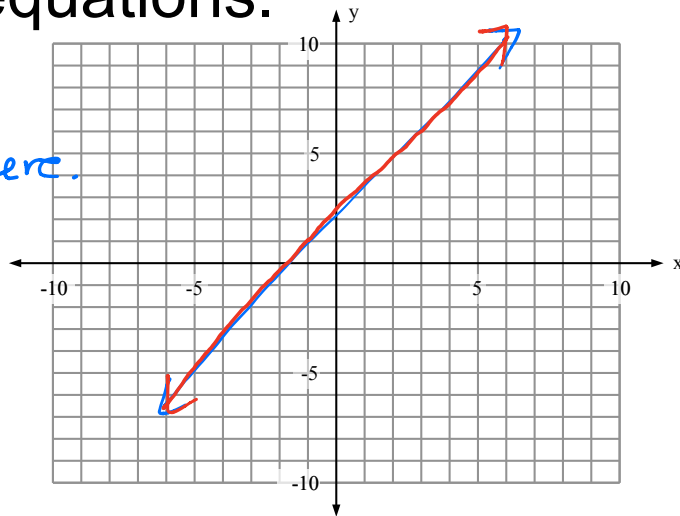


NO TOUCH = NO SOLUTION

# #15

Describe what the lines would look like if there are **infinitely many solutions** to the system of equations.

Same lines  
intersect everywhere.



MANY TOUCHING POINTS = MANY SOLUTIONS



# #16

Is the point  $(-4, -3)$  a solution to the system?  
 $x$   $y$

No...  $(-4, -3)$  is only on one line. It must be on BOTH lines to be a solution.

$$8x - y = -29$$

$$-9x - 3y = 26$$

$$\begin{aligned} 8(-4) - (-3) &= -29 \\ -32 + 3 & \\ -29 &= -29 \end{aligned}$$

✓

$$\begin{aligned} -9(-4) - 3(-3) &= 26 \\ 36 + 9 & \\ 45 &\neq 26 \end{aligned}$$

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