

Name: _____ Period: _____ Date: _____

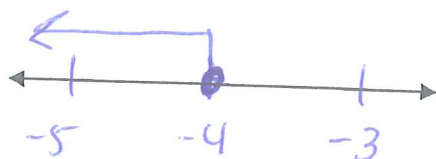
Shapes of Algebra Unit Test – Algebra 8

Show all work for full credit. Answers should be in fraction form, if necessary. No decimals!

Solve the inequality and graph your solution on a number line.

1. $-4(2+x) \geq 8$

$$\begin{array}{r} -8 - 4x \geq 8 \\ +8 \quad +8 \\ \hline -4x \geq 16 \\ \frac{-4}{-4} \quad \frac{-4}{-4} \\ \hline x \leq -4 \end{array}$$



2. $2(x+5)-6 > 2(2x-7)$

$$\begin{array}{r} 2x + 10 - 6 > 4x - 14 \\ 2x + 4 > 4x - 14 \\ -4 \quad -4 \\ \hline 2x > 4x - 18 \\ -4x \quad -4x \\ \hline -2x > -18 \\ \frac{-2}{-2} \quad \frac{-18}{-2} \\ \hline x < 9 \end{array}$$



Write the equation in $y = mx + b$ form. Identify the slope, x-intercept, and y-intercept.

3. $6x + 2y = -18$

$$\begin{array}{r} -6x \quad -6x \\ \hline 2y = -6x - 18 \\ \frac{2}{2} \quad \frac{-6}{2} \quad \frac{-18}{2} \\ \hline y = -3x - 9 \end{array}$$

slope: -3

x-int: (-3, 0)

y-int: (0, -9)

4. $-12x = -6 + 3y$

$$\begin{array}{r} -3y \quad -3y \\ \hline -3y - 12x = -6 \\ +12x \quad +12x \\ \hline -3y = 12x - 6 \\ \frac{-3}{-3} \quad \frac{12}{-3} \quad \frac{-6}{-3} \\ \hline y = -4x + 2 \end{array}$$

slope: -4

x-int: ($\frac{1}{2}$, 0)

y-int: (0, 2)

Write the equation in $Ax + By = C$ form. Identify the slope, x-intercept, and y-intercept. (Remember A, B, and C must be integers.)

5. $y = \frac{1}{3}x + 11$

$$\begin{array}{r} -\frac{1}{3}x \quad -\frac{1}{3}x \\ \hline (-\frac{1}{3}x + y = 11) \\ \cdot 3 \qquad \qquad 3 \\ \hline -x + 3y = 33 \end{array}$$

slope: $\frac{1}{3}$

x-int: $(-33, 0)$

y-int: $(0, 11)$

6. $x = -4y - 16$

$$\begin{array}{r} +4y \quad +4y \\ \hline x + 4y = -16 \end{array}$$

slope: $-\frac{1}{4}$

x-int: $(-16, 0)$

y-int: $(0, -4)$

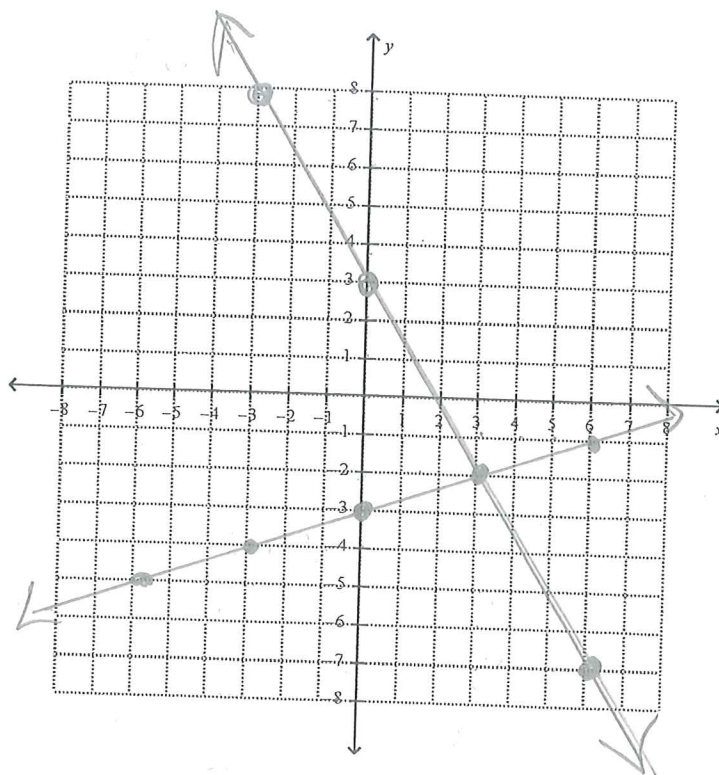
7. Solve the linear system by graphing below.

$$\begin{cases} 5x + 3y = 9 \\ y = \frac{1}{3}x - 3 \end{cases}$$

$$\begin{array}{r} 5x + 3y = 9 \\ -5x \qquad -5x \\ \hline 3y = -5x + 9 \end{array}$$

$$\frac{3y}{3} = \frac{-5x + 9}{3}$$

$$y = -\frac{5}{3}x + 3$$



Common Solution: $(3, -2)$

Solve the following systems of equations using the method of your choice:

8.
$$\begin{cases} y = \frac{3}{2}x - 12 \\ y = \frac{1}{2}x + 4 \end{cases}$$

$$\boxed{(16, 12)}$$

1st

$$\begin{array}{r} \frac{3}{2}x - 12 = \frac{1}{2}x + 4 \\ \quad +12 \quad \quad +12 \\ \hline \frac{3}{2}x = \frac{1}{2}x + 16 \\ -\frac{1}{2}x \quad -\frac{1}{2}x \\ \hline x = 16 \end{array}$$

2nd

$$\begin{aligned} y &= \frac{1}{2}x + 4 \\ y &= \frac{1}{2}(16) + 4 \\ y &= 8 + 4 = 12 \end{aligned}$$

9.
$$\begin{cases} x + 4y = 7 \\ 3x + 7y = 6 \end{cases}$$

3rd

$$\begin{aligned} x &= -4y + 7 \\ x &= -4(3) + 7 \\ x &= -12 + 7 = -5 \end{aligned}$$

$$\boxed{(-5, 3)}$$

1st

$$\begin{array}{r} x + 4y = 7 \\ \quad -4y \quad -4y \\ \hline x = -4y + 7 \end{array}$$

2nd

$$\begin{aligned} 3x + 7y &= 6 \\ 3(-4y + 7) + 7y &= 6 \\ -12y + 21 + 7y &= 6 \\ -5y + 21 &= 6 \\ \quad -21 \quad -21 \\ \hline -5y &= -15 \\ \quad -5 \quad -5 \\ \hline y &= 3 \end{aligned}$$

10.
$$\begin{cases} 3x + 3y = 12 \\ -3x + 12y = 3 \end{cases}$$

1st

$$\begin{array}{r} 3x + 3y = 12 \\ -3x \quad \quad -3x \\ \hline 3y = -3x + 12 \\ \quad 3 \quad 3 \quad 3 \\ \hline y = -x + 4 \end{array}$$

2nd

$$\begin{array}{r} -3x + 12y = 3 \\ -3x + 12(-x + 4) = 3 \\ -3x - 12x + 48 = 3 \\ -15x + 48 = 3 \\ \quad -48 \quad -48 \\ \hline -15x = -45 \\ \quad -15 \quad -15 \\ \hline x = 3 \end{array}$$

3rd

$$\begin{aligned} y &= -x + 4 \\ y &= -3 + 4 = 1 \end{aligned}$$

$$\boxed{(3, 1)}$$

Use a system of equations to solve the following problem.

11. For lunch, Jack had a Big Mac and two small fries containing 1000 calories. Randy had three Big Macs and two small fries for 2080 calories. How many calories are there in a Big Mac? How many calories in a small order of fries?

Let x = Big Mac
 y = small fries

$$\begin{cases} x + 2y = 1000 \\ 3x + 2y = 2080 \end{cases}$$

2nd $x + 2y = 1000$

$$\begin{array}{r} x + 2y = 1000 \\ -2y \quad -2y \\ \hline \end{array}$$

$$x = -2y + 1000$$

5th

Big Mac 540 calories

small fries 230 calories

3rd $3(-2y + 1000) + 2y = 2080$

$$-6y + 3000 + 2y = 2080$$

$$-4y + 3000 = 2080$$

$$\begin{array}{r} -4y + 3000 = 2080 \\ -3000 \quad -3000 \\ \hline \end{array}$$

$$\begin{array}{r} -4y = -920 \\ -4 \quad -4 \\ \hline \end{array}$$

$$y = 230$$

4th

$$x = -2y + 1000$$

$$x = -2(230) + 1000$$

$$x = 540$$

BONUS (5 pts.): The entire test must be completed in order to get bonus points.

Solve the following system of equations.

$$\begin{cases} 4x - 2y = 32 \\ -3x - 5y = -11 \end{cases}$$

$$\begin{array}{r} \text{1st} \\ 4x - 2y = 32 \\ -4x \quad -4x \\ \hline -2y = -4x + 32 \\ -2 \quad -2 \quad -2 \\ \hline \end{array}$$

$$y = 2x - 16$$

3rd

$$y = 2x - 16$$

$$y = 2(7) - 16$$

$$y = 14 - 16 = -2$$

$$\boxed{(7, -2)}$$

2nd

$$-3x - 5y = -11$$

$$-3x - 5(2x - 16) = -11$$

$$-3x - 10x + 80 = -11$$

$$-13x + 80 = -11$$

$$\begin{array}{r} -13x + 80 = -11 \\ -80 \quad -80 \\ \hline \end{array}$$

$$\begin{array}{r} -13x = -91 \\ -13 \quad -13 \\ \hline \end{array}$$

$$x = 7$$