

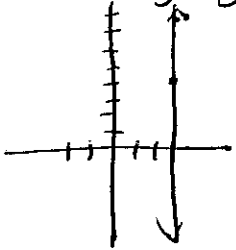
KEY

You may use a regular calculator for this test.

1. Write the slope-intercept form of the equation of the line.

a. through (3, 4), and (3, 8)

$$M = \frac{8-4}{3-3} = \frac{4}{0} = \text{undefined!}$$



$$X=3$$

b. through (-4, 2), perpendicular to $2x-3y=1$

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

$$y-2 = -\frac{3}{2}x - 6$$

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

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

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

$$M_{old} = \frac{2}{3}$$

$$M_{new} = -\frac{3}{2}$$

2. Solve.

a. $|2x+5|=7$

$$\begin{array}{r} 2x+5=7 \\ -5 \quad -5 \\ \hline 2x=2 \\ \frac{2}{2} \quad \frac{2}{2} \end{array}$$

$$\begin{array}{r} 2x+5=-7 \\ -5 \quad -5 \\ \hline 2x=-12 \\ \frac{2}{2} \quad \frac{-12}{2} \end{array}$$

$$X=1$$

$$X=-6$$

b. $3|x|-2=10$

$$+2 \quad +2$$

$$\frac{3|x|=12}{\frac{3}{3} \quad \frac{12}{3}}$$

$$|x|=4$$

$$X=4$$

$$X=-4$$

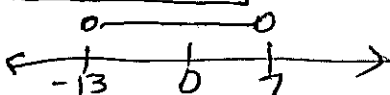
$|x+3|=5 < 5$

Graph your answer and give interval notation.

$$\begin{array}{r} |x+3| - 5 < 5 \\ +5 \quad +5 \\ \hline |x+3| < 10 \end{array}$$

$$\begin{array}{r} -10 < x+3 < 10 \\ -3 \quad -3 \quad -3 \end{array}$$

$$-13 < x < 7$$



$$(-13, 7)$$

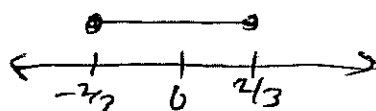
$3|x| \leq 2$

Graph your answer and give interval notation.

$$\frac{3|x| \leq 2}{\frac{3}{3} \quad \frac{2}{3}}$$

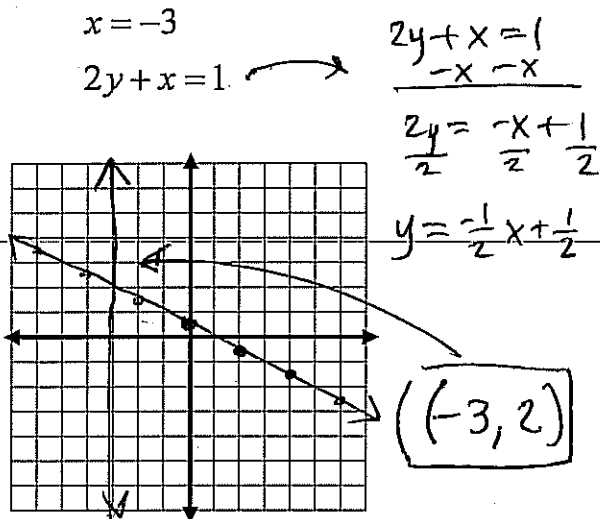
$$|x| \leq \frac{2}{3}$$

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



$$\left[-\frac{2}{3}, \frac{2}{3}\right]$$

3. Solve by graphing.



4. Simplify, graph, and give the interval notation.

a. $-3(x-4) + 2x > 4x - 3$

$$\begin{aligned} -3x + 12 + 2x &> 4x - 3 \\ -x + 12 &> 4x - 3 \\ -4x & -x \\ \hline -5x + 12 &> -3 \\ -12 & -12 \\ \hline -5x &> -15 \\ \boxed{x < 3} \end{aligned}$$

Interval notation: $(-\infty, 3)$

b. $-4x > 8$ OR $5x - 1 \geq 4$

$$\begin{aligned} \frac{-4x}{-4} &> \frac{8}{-4} & \frac{5x - 1}{+1} &\geq \frac{4}{+1} \\ x < -2 & \text{OR} & x &\geq 1 \end{aligned}$$

$x < -2$ OR $x \geq 1$

5. Solve the systems any way you want.

a. $3x + 2y = 4$
 $y = 2x - 5$

$$\begin{aligned} 3x + 2(2x - 5) &= 4 \\ 3x + 4x - 10 &= 4 \\ 7x - 10 &= 4 \\ 7x &= 14 \end{aligned}$$

$x = 2$

$$y = 2(2) - 5 = -1$$

$(2, -1)$

b. $2(3x - y = 7) \rightarrow 6x - 2y = 14$
 $2y - 6x = -1 \rightarrow -6x + 2y = -1$

$$\begin{aligned} 6x - 2y &= 14 \\ -6x + 2y &= -1 \\ \hline 0 &= 13 \end{aligned}$$

No solution!
(parallel lines)

6. A fish only lives at a depth between 30 feet and 10 feet below the surface of the water. Assuming water is at 0 feet elevation, write out a compound inequality that describes the level of water at which fish can live.

$-30 < x < -10$

7. Aruzhanna needs to make more than \$500 working at the restaurant to buy the used car that she wants. If she makes \$300 in tips and \$8 per hour, write an inequality that represents Aruzhanna's situation and define any variables you are using. You do not have to solve it.

$300 + 8x > 500$

$x = \# \text{ hours she works}$

8. Solve using a system of equations. Any method is okay.

A chemist mixed a 10% salt solution with a 45% salt solution and got 25 liters of a 30% salt solution.

How much of each did she mix together originally?

$$\begin{aligned} x + y &= 25 \\ .10x + .45y &= .30(25) \end{aligned}$$

$$\begin{aligned} y &= -x + 25 \\ .10x + .45(-x + 25) &= 7.5 \\ .10x - .45x + 11.25 &= 7.5 \\ -.35x &= -3.75 \end{aligned}$$

x = liters of 10% salt solution
 y = liters of 45% salt solution

The chemist mixed 10.71 liters of 10% salt solution with 14.29 liters of 45% salt solution

$$x = 10.71 \text{ liters}$$

$$10.71 + y = 25$$

$$y = 14.29 \text{ liters}$$

9. Solve using a system of equations. Any method is okay.

Cablevision has a \$60 setup fee and costs \$80 per month, and Comcrash has a \$160 equipment fee and costs \$70 per month. In how many months will the cost be the same? What will that cost be?

Cablevision: $C = 60 + 80x$

Comcrash: $C = 160 + 70x$

x = # months
 C = cost in \$

$$160 + 70x = 60 + 80x$$

$$160 = 60 + 10x$$

$$100 = 10x$$

$$x = 10 \text{ months}$$

$$C = 60 + 80(10)$$

$$C = 60 + 800$$

$$C = \$860$$

In 10 months, they will both cost \$860

10. Solve using a system of equations. Any method is okay.

Thirteen donuts and four pieces of pie cost Mr. Simon \$24.00. Six donuts and two pieces of pie cost Mr. Simon \$11.40. How much did each donut and each piece of pie cost?

$$13d + 4p = 24.00$$

$$13d + 4p = 24$$

d = price of donut

$$-2(6d + 2p = 11.40) \rightarrow -12d - 4p = -22.80$$

$$-12d - 4p = -22.80$$

p = price of pie

$$d = \$1.20$$

A donut costs \$1.20 each and a piece of pie cost \$2.10 each

$$6(1.20) + 2p = 11.40$$

$$7.20 + 2p = 11.40$$

$$2p = 4.20$$

$$p = \$2.10$$

11. In order for a point to be a solution to a system of equations, which of the following is true?

- a) It must work in one equation
- c) It must work in both equations

- b) It must work in at least one equation
- d) None of the above