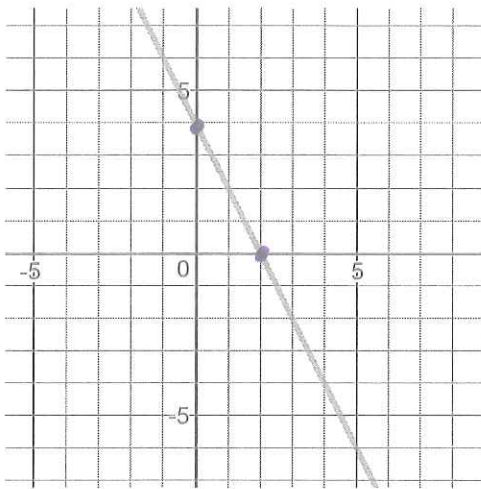


Section 4.7 Standard Form and Graphing Using Intercepts

Identifying Intercepts

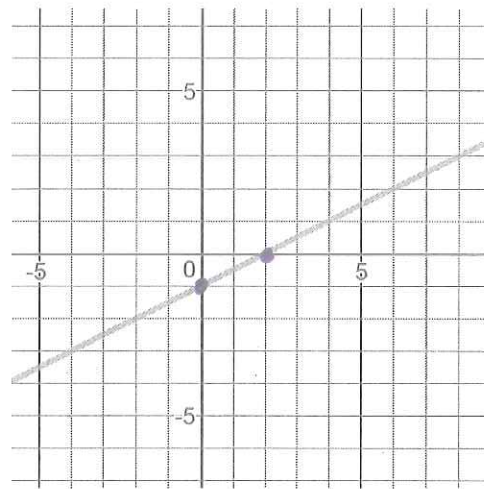
1. Identify the x-intercept and the y-intercept for each line below.

a.



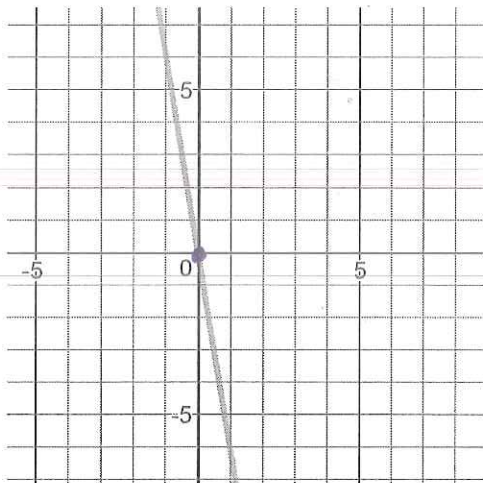
x-intercept:  $(2, 0)$   
 y-intercept:  $(0, 4)$

b.



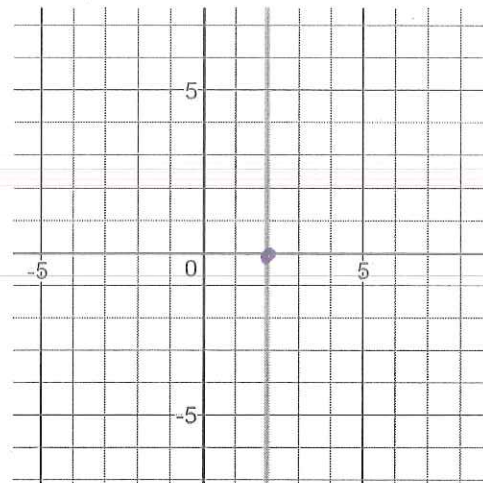
x-intercept:  $(2, 0)$   
 y-intercept:  $(0, -1)$

c.



x-intercept:  $(0, 0)$   
 y-intercept:  $(0, -4)$

d.



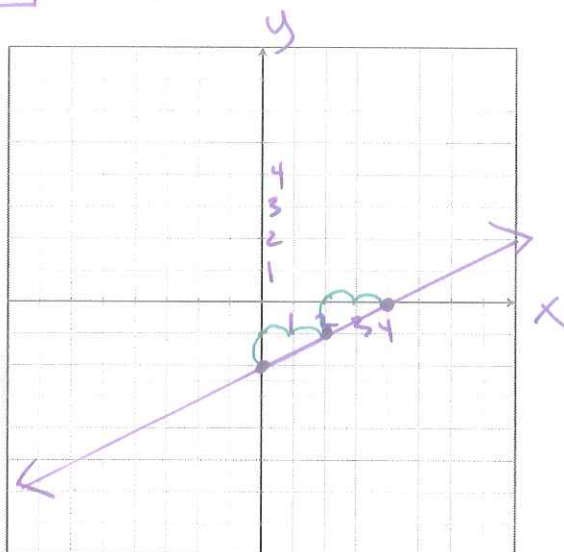
x-intercept:  $(2, 0)$   
 y-intercept: none

Standard Form of a Line:  $Ax + By = C$

2. Find the x-intercept and y-intercept for the equation  $2x - 4y = 8$ . Then graph the equation.

$$\begin{aligned} \text{Let } x &= 0 \\ 2(0) - 4y &= 8 \\ 0 - 4y &= 8 \\ \frac{-4y}{-4} &= \frac{8}{-4} \\ y &= -2 \\ (0, -2) \end{aligned}$$

$$\begin{aligned} \text{Let } y &= 0 \\ 2x - 4(0) &= 8 \\ 2x - 4(0) &= 8 \\ \frac{2x}{2} &= \frac{8}{2} \\ x &= 4 \\ (4, 0) \end{aligned}$$



Rewrite the equation in slope-intercept form and check the graph.

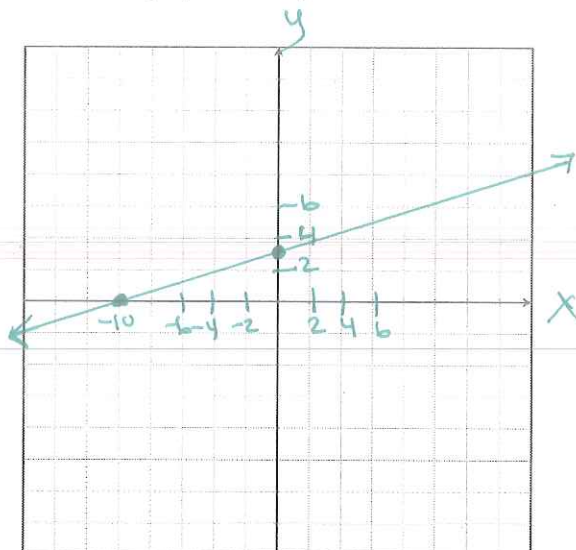
$$\begin{aligned} y &= mx + b \\ \text{Solve } 2x - 4y &= 8 \\ \text{for } y \end{aligned}$$

$$\begin{aligned} 2x - 4y &= 8 \\ -2x \quad -2x \\ -4y &= -2x + 8 \\ \frac{-4y}{-4} &= \frac{-2x + 8}{-4} \\ y &= \frac{1}{2}x - 2 \end{aligned}$$

3. Find the x-intercept and y-intercept for the equation  $-x + 3y = 10$ . Then graph the equation.

$$\begin{aligned} \text{Let } x &= 0 \\ -0 + 3y &= 10 \\ \frac{3y}{3} &= \frac{10}{3} \\ y &= \frac{10}{3} \\ (0, 10/3) \\ \text{or} \\ (0, 3\frac{1}{3}) \end{aligned}$$

$$\begin{aligned} \text{Let } y &= 0 \\ -x + 3(0) &= 10 \\ -x &= 10 \\ \frac{-x}{-1} &= \frac{10}{-1} \\ x &= -10 \\ (-10, 0) \end{aligned}$$



Rewrite the equation in slope-intercept form and check the graph.

$$\begin{aligned} -x + 3y &= 10 \\ +x \quad +x \end{aligned}$$

$$\begin{aligned} \frac{3y}{3} &= \frac{x + 10}{3} \\ y &= \frac{1}{3}x + \frac{10}{3} \end{aligned}$$

$\rightarrow y = mx + b$

$\rightarrow Ax + By = C$

4. Rewrite the line in slope-intercept in standard form.

a.  $y = 2x + 1$   
 $-2x \quad -2x$   
 $-2x + y = 1$

b.  $y = -\frac{2}{3}x - 4 \cdot 3$   
 $3y = -2x - 12$   
 $+2x \quad +2x$   
 $2x + 3y = -12$

5. You are planning a party and you are going to order pizzas and salads. The pizzas are \$10 each and the salads are \$8 each. Let p be the number of pizzas you order and let s be the number of salads you order. If you have a budget of \$80, what combinations of pizzas and salads can you buy?

a. Write an equation in standard form to model this situation.

$10p + 8s = 80$

b. Find the p-intercept. What does this represent?

$10p + 8(0) = 80$   
 $\frac{10p}{10} = \frac{80}{10} \quad p = 8$

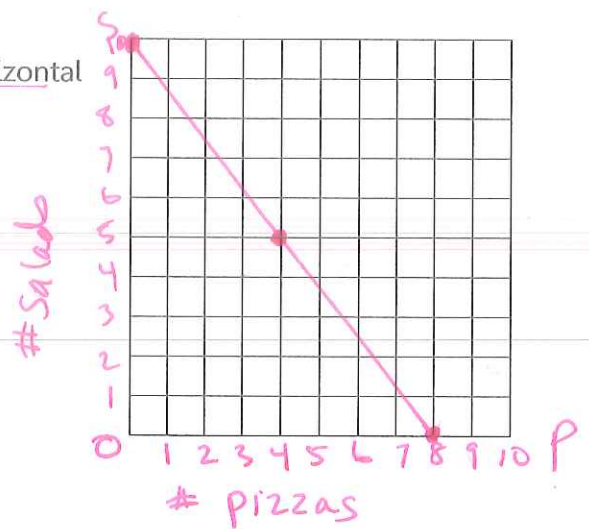
(p, s)  
 (8, 0)

c. Find the s-intercept. What does it represent?

$10(0) + 8s = 80$   
 $\frac{8s}{8} = \frac{80}{8} \quad s = 10$

(0, 10)

d. Graph this equation using the intercepts. Use p on the horizontal axis and s on the vertical axis. Label the axes and scale.



e. Solve your equation for s to put it in slope-intercept form. Use this to state and interpret the slope for this equation.

$10p + 8s = 80$   
 $-10p \quad -10p$   
 $\frac{8s}{8} = \frac{-10p + 80}{8}$   
 $s = -\frac{5}{4}p + 10$

$y = mx + b$   
 $m = -\frac{5}{4}$  If we order 5 fewer salads we can get 4 more pizzas.

More Practice

6. A couple is planning their wedding. They want the total cost of catering ( $x$ , in dollars) and renting the venue ( $y$ , in dollars) to be \$4,000. They plan to hit this limit. This can be modeled by the equation  $x + y = 4000$ .

a. Find the x-intercept. What does this represent?

$$\begin{aligned} \text{Let } y &= 0 \\ x + 0 &= 4000 \\ x &= 4000 \end{aligned}$$

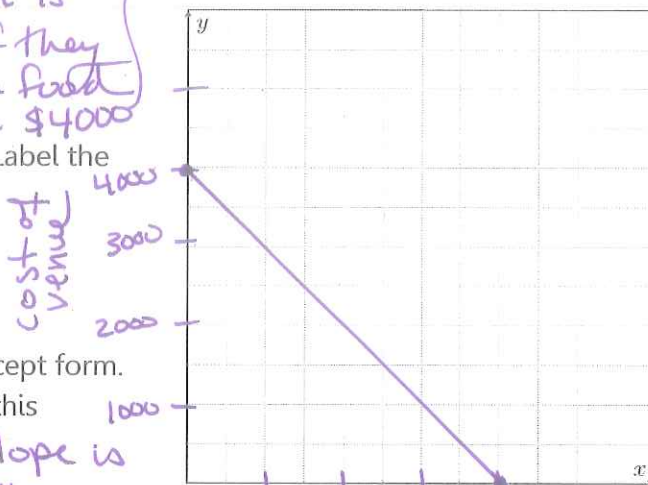
The x-intercept is  $(4000, 0)$ . If they spend \$4000 on catering, they will have \$0 for food.

b. Find the y-intercept. What does it represent?

$$\begin{aligned} \text{Let } x &= 0 \\ 0 + y &= 4000 \\ y &= 4000 \end{aligned}$$

The y-intercept is  $(0, 4000)$ . If they spend \$0 on food they will have \$4000 for the venue.

c. Graph this equation using the intercepts. Label the axes and scale.



d. Solve  $x + y = 4000$  to put it in slope-intercept form. Use this to state and interpret the slope for this equation.

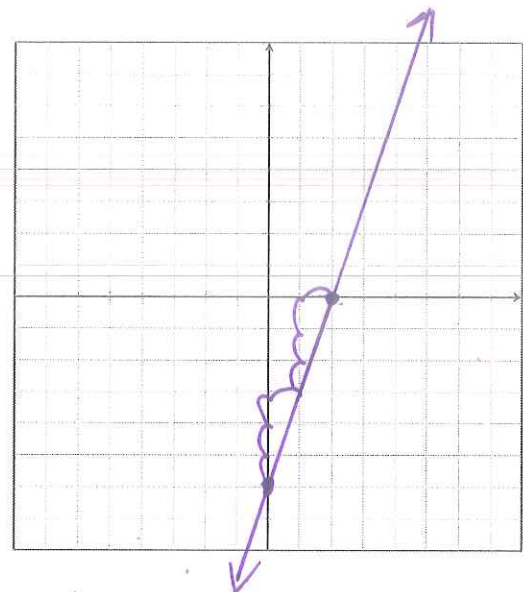
$$y = -x + 4000 \quad \text{The slope is}$$

-\$1. For each additional dollar they spend on catering they have 1 less for the venue. Cost of catering

7. Find the x-intercept and y-intercept for the equation  $6x - 2y = 12$ . Then graph the equation.

$$\begin{aligned} \text{Let } x &= 0 \\ 6(0) - 2y &= 12 \\ -2y &= 12 \\ \frac{-2y}{-2} &= \frac{12}{-2} \\ y &= -6 \\ (0, -6) \end{aligned}$$

$$\begin{aligned} \text{Let } y &= 0 \\ 6x - 2(0) &= 12 \\ 6x &= 12 \\ \frac{6x}{6} &= \frac{12}{6} \\ x &= 2 \\ (2, 0) \end{aligned}$$



Rewrite the equation in slope-intercept form and check the graph.

$$\begin{aligned} 6x - 2y &= 12 \\ -6x \quad -6x & \\ -2y &= -6x + 12 \\ \frac{-2y}{-2} &= \frac{-6x + 12}{-2} \\ y &= 3x - 6 \end{aligned}$$

The graph has a y-int of -6 and a slope of 3!