

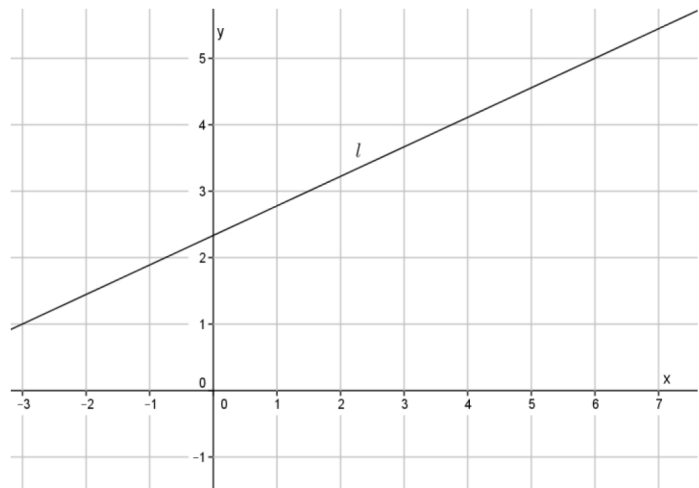
Name \_\_\_\_\_

Date \_\_\_\_\_

## Some Facts about Graphs of Linear Equations in Two

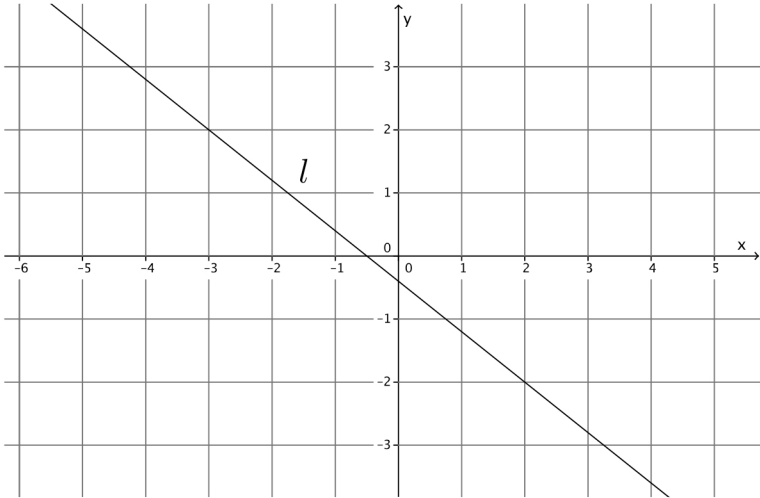
### Variables

1. Write the equation for the line  $l$  shown in the figure below.

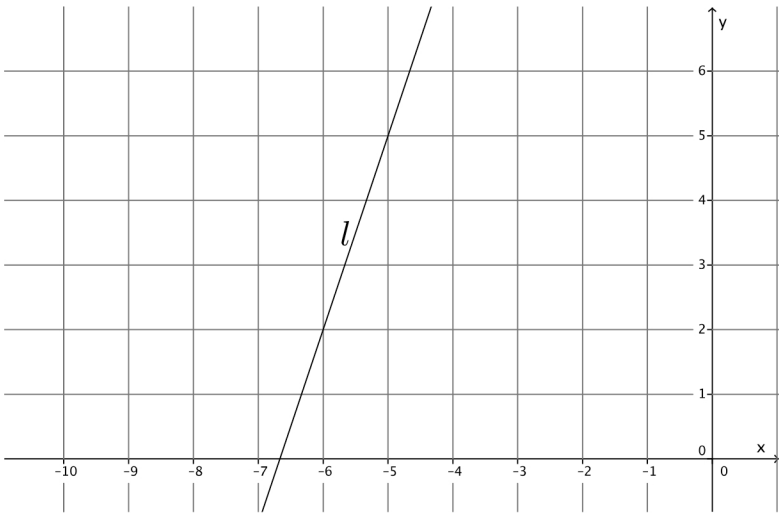


2. A line goes through the point  $(5, -7)$  and has slope  $m = -3$ . Write the equation that represents the line.

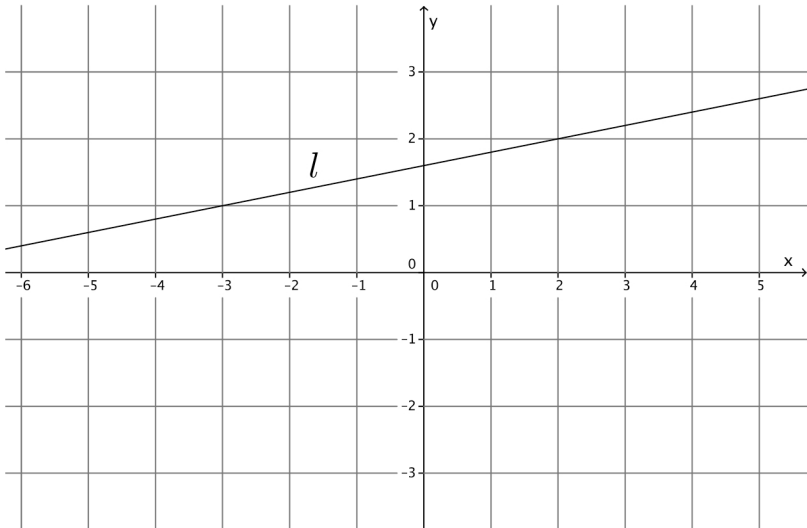
1. Write the equation for the line  $l$  shown in the figure.



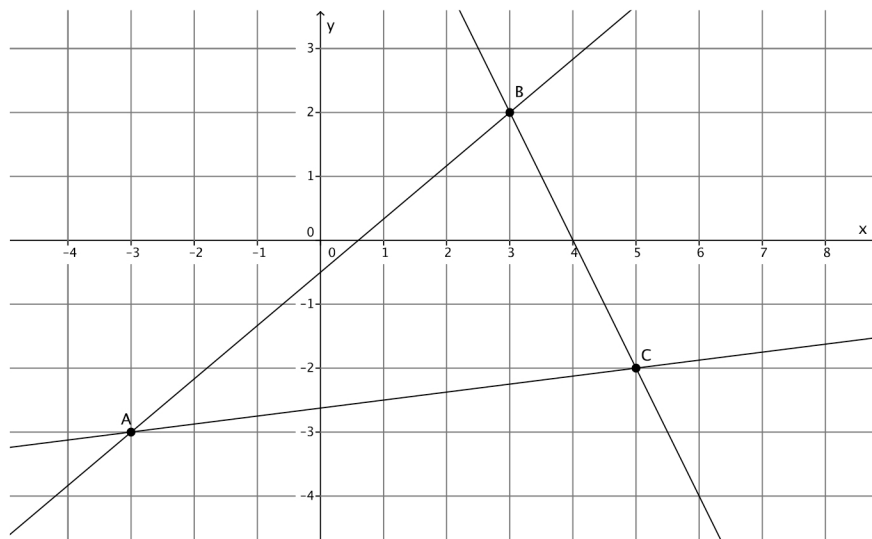
2. Write the equation for the line  $l$  shown in the figure.



3. Write the equation for the line  $l$  shown in the figure.



4. Triangle  $ABC$  is made up of line segments formed from the intersection of lines  $L_{AB}$ ,  $L_{BC}$ , and  $L_{AC}$ . Write the equations that represent the lines that make up the triangle.



5. Write the equation for the line that goes through point  $(-10, 8)$  with slope  $m = 6$ .
6. Write the equation for the line that goes through point  $(12, 15)$  with slope  $m = -2$ .
7. Write the equation for the line that goes through point  $(1, 1)$  with slope  $m = -9$ .
8. Determine the equation of the line that goes through points  $(1, 1)$  and  $(3, 7)$ .

Note that some students may write equations in standard form.

1. Write the equation for the line  $l$  shown in the figure below.

Using the points  $(-3, 1)$  and  $(6, 5)$ , the slope of the line is

$$m = \frac{5 - 1}{6 - (-3)}$$

$$m = \frac{4}{9}$$

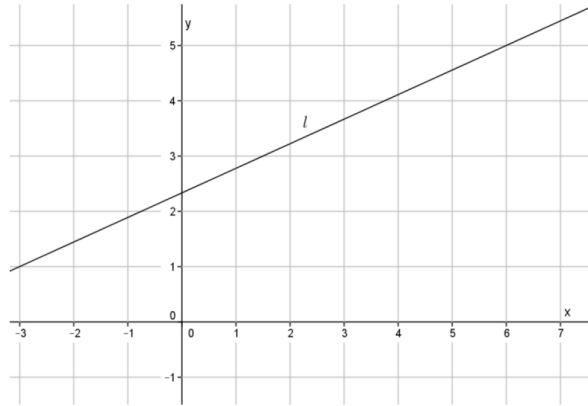
$$5 = \frac{4}{9}(6) + b$$

$$5 = \frac{8}{3} + b$$

$$5 - \frac{8}{3} = \frac{8}{3} - \frac{8}{3} + b$$

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

The equation of the line is  $y = \frac{4}{9}x + \frac{7}{3}$ .



2. A line goes through the point  $(5, -7)$  and has slope  $m = -3$ . Write the equation that represents the line.

$$-7 = -3(5) + b$$

$$-7 = -15 + b$$

$$8 = b$$

The equation of the line is  $y = -3x + 8$ .

Students practice writing equations from graphs of lines. Students write the equation of a line given only the slope and a point.

1. Write the equation for the line  $l$  shown in the figure.

Using the points  $(-3, 2)$  and  $(2, -2)$ , the slope of the line is

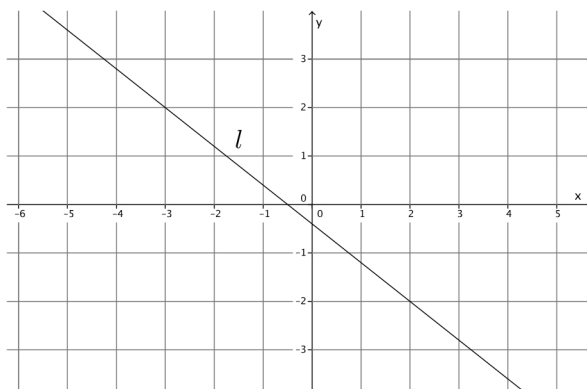
$$\begin{aligned} m &= \frac{2 - (-2)}{-3 - 2} \\ &= \frac{4}{-5} \\ &= -\frac{4}{5}. \end{aligned}$$

$$2 = \left(-\frac{4}{5}\right)(-3) + b$$

$$2 = \frac{12}{5} + b$$

$$\begin{aligned} 2 - \frac{12}{5} &= \frac{12}{5} - \frac{12}{5} + b \\ -\frac{2}{5} &= b \end{aligned}$$

The equation of the line is  $y = -\frac{4}{5}x - \frac{2}{5}$ .



2. Write the equation for the line  $l$  shown in the figure.

Using the points  $(-6, 2)$  and  $(-5, 5)$ , the slope of the line is

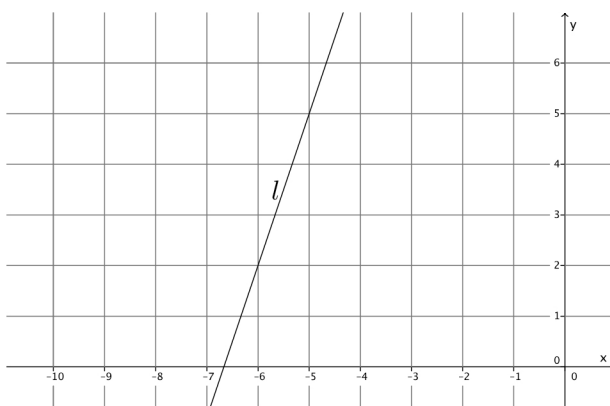
$$\begin{aligned} m &= \frac{2 - 5}{-6 - (-5)} \\ &= \frac{-3}{-1} \\ &= 3. \end{aligned}$$

$$5 = 3(-5) + b$$

$$5 = -15 + b$$

$$20 = b$$

The equation of the line is  $y = 3x + 20$ .



3. Write the equation for the line  $l$  shown in the figure.

Using the points  $(-3, 1)$  and  $(2, 2)$ , the slope of the line is

$$\begin{aligned} m &= \frac{1 - 2}{-3 - 2} \\ &= \frac{-1}{-5} \\ &= \frac{1}{5}. \end{aligned}$$

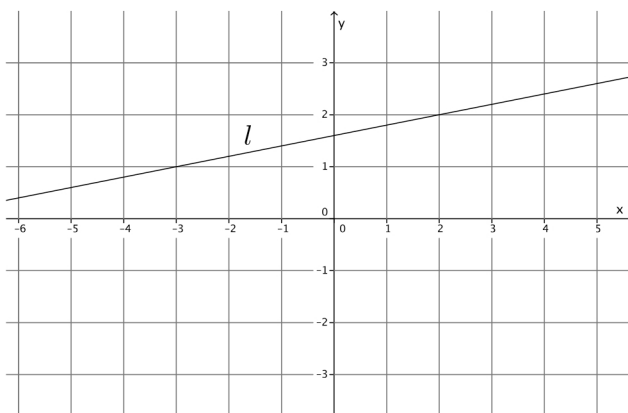
$$2 = \frac{1}{5}(2) + b$$

$$2 = \frac{2}{5} + b$$

$$2 - \frac{2}{5} = \frac{2}{5} - \frac{2}{5} + b$$

$$\frac{8}{5} = b$$

The equation of the line is  $y = \frac{1}{5}x + \frac{8}{5}$ .



4. Triangle  $ABC$  is made up of line segments formed from the intersection of lines  $L_{AB}$ ,  $L_{BC}$ , and  $L_{AC}$ . Write the equations that represent the lines that make up the triangle.

$A(-3, -3)$ ,  $B(3, 2)$ ,  $C(5, -2)$

The slope of  $L_{AB}$ :

$$\begin{aligned} m &= \frac{-3 - 2}{-3 - 3} \\ &= \frac{-5}{-6} \\ &= \frac{5}{6} \end{aligned}$$

$$2 = \frac{5}{6}(3) + b$$

$$2 = \frac{5}{2} + b$$

$$2 - \frac{5}{2} = \frac{5}{2} - \frac{5}{2} + b$$

$$-\frac{1}{2} = b$$

The equation of  $L_{AB}$  is  $y = \frac{5}{6}x - \frac{1}{2}$ .

The slope of  $L_{BC}$ :

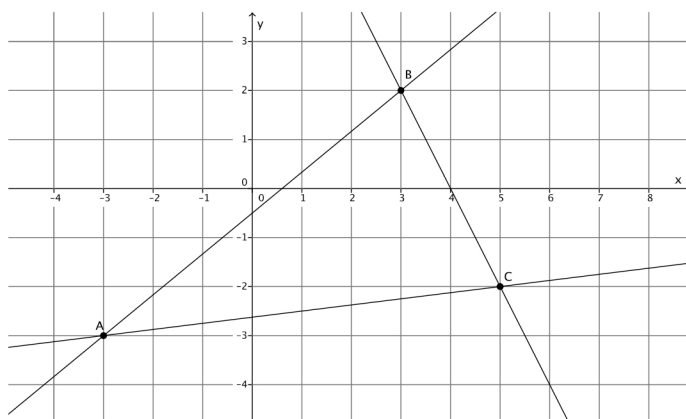
$$\begin{aligned} m &= \frac{2 - (-2)}{3 - 5} \\ &= \frac{4}{-2} \\ &= -2 \end{aligned}$$

$$2 = -2(3) + b$$

$$2 = -6 + b$$

$$8 = b$$

The equation of  $L_{BC}$  is  $y = -2x + 8$ .



The slope of  $L_{AC}$ :

$$\begin{aligned} m &= \frac{-3 - (-2)}{-3 - 5} \\ &= \frac{-1}{-8} \\ &= \frac{1}{8} \end{aligned}$$

$$-2 = \frac{1}{8}(5) + b$$

$$-2 = \frac{5}{8} + b$$

$$-2 - \frac{5}{8} = \frac{5}{8} - \frac{5}{8} + b$$

$$-\frac{21}{8} = b$$

The equation of  $L_{AC}$  is  $y = \frac{1}{8}x - \frac{21}{8}$ .

5. Write the equation for the line that goes through point  $(-10, 8)$  with slope  $m = 6$ .

$$8 = 6(-10) + b$$

$$8 = -60 + b$$

$$68 = b$$

*The equation of the line is  $y = 6x + 68$ .*

6. Write the equation for the line that goes through point  $(12, 15)$  with slope  $m = -2$ .

$$15 = -2(12) + b$$

$$15 = -24 + b$$

$$39 = b$$

*The equation of the line is  $y = -2x + 39$ .*

7. Write the equation for the line that goes through point  $(1, 1)$  with slope  $m = -9$ .

$$1 = -9(1) + b$$

$$1 = -9 + b$$

$$10 = b$$

*The equation of the line is  $y = -9x + 10$ .*

8. Determine the equation of the line that goes through points  $(1, 1)$  and  $(3, 7)$ .

*The slope of the line is*

$$\begin{aligned} m &= \frac{1 - 7}{1 - 3} \\ &= \frac{-6}{-2} \\ &= 3. \end{aligned}$$

*The y-intercept of the line is*

$$7 = 3(3) + b$$

$$7 = 9 + b$$

$$-2 = b.$$

*The equation of the line is  $y = 3x - 2$ .*