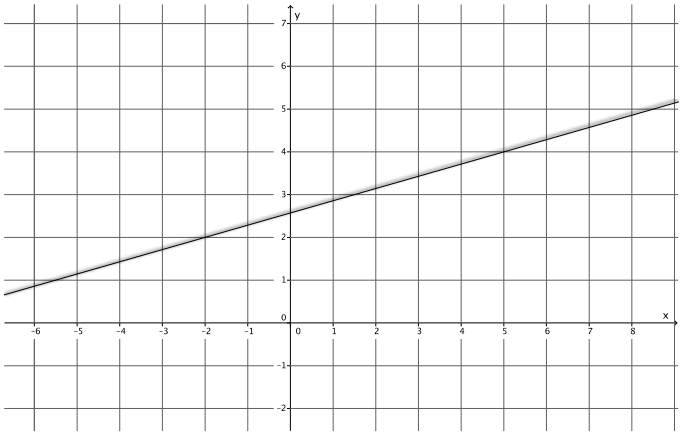
Lesson 21: Some Facts about Graphs of Linear Equations in Two Variables

Classwork

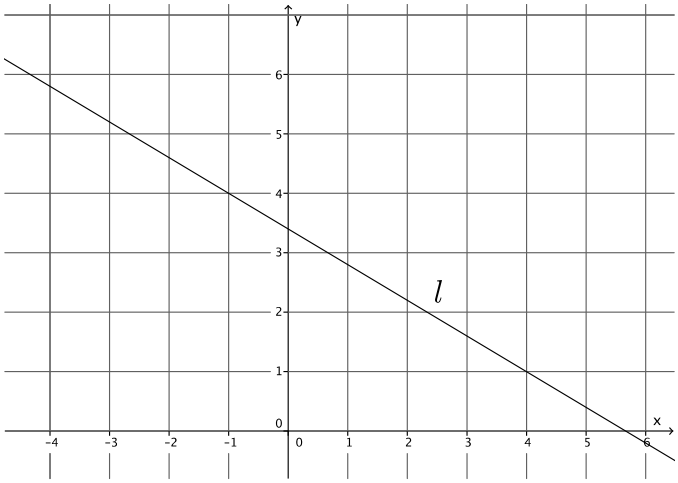
Example 1

Let a line l be given in the coordinate plane. What linear equation is the graph of line?



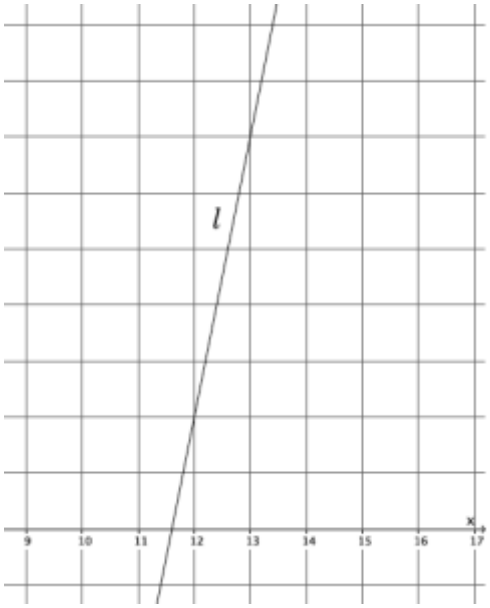
Example 2

Let a line l be given in the coordinate plane. What linear equation is the graph of line?



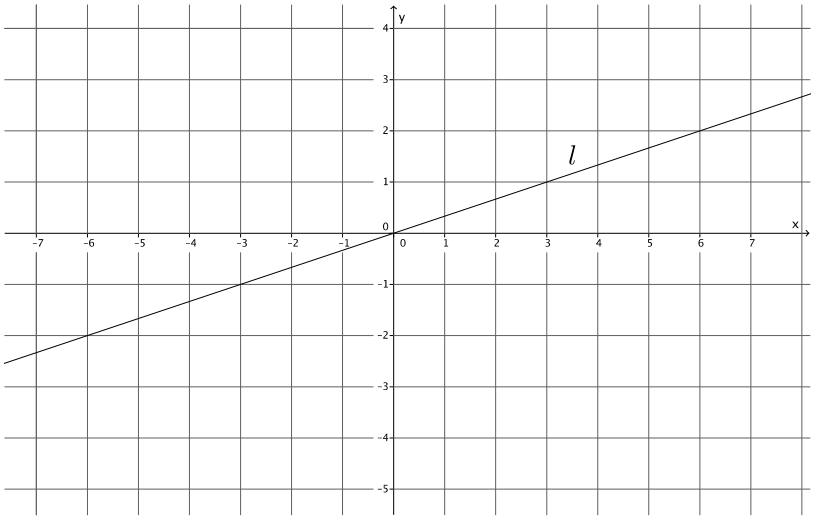
Example 3

Let a line l be given in the coordinate plane. What linear equation is the graph of line?



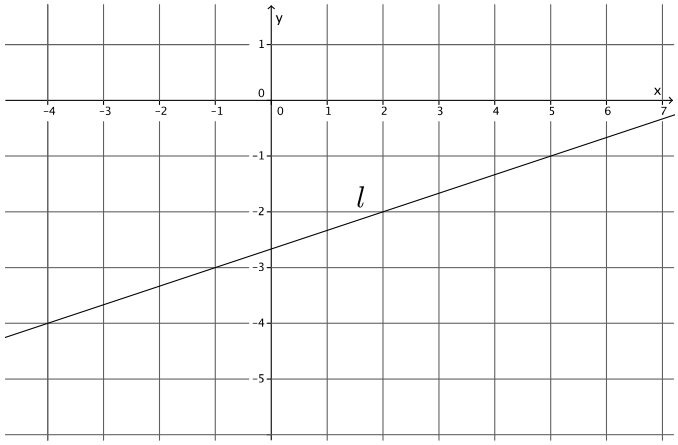
Example 4

Let a line l be given in the coordinate plane. What linear equation is the graph of line?

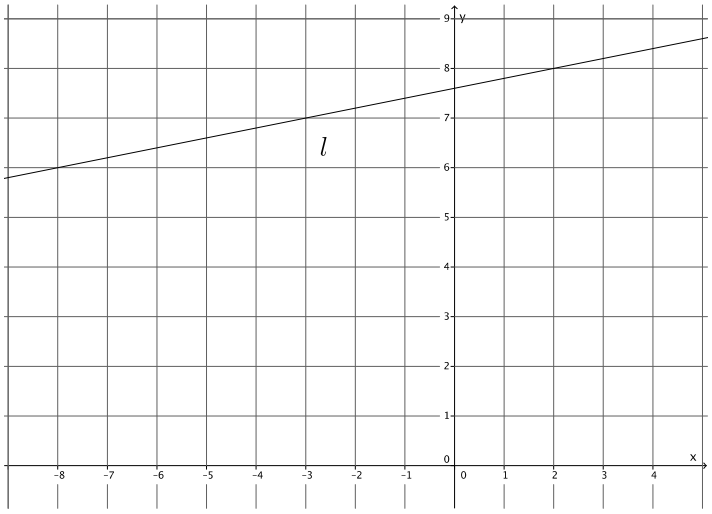


Exercises

1. Write the equation for the line l shown in the graph.

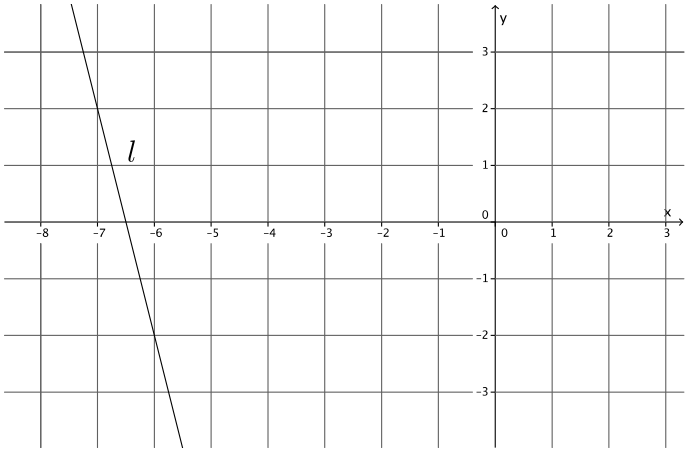


2. Write the equation for the line l shown in the graph.



3. Determine the equation of the line that goes through points $(-4, 5)$ and $(2, 3)$.

4. Write the equation for the line l shown in the graph.



5. A line goes through the point $(8, 3)$ and has slope $m = 4$. Write the equation that represents the line.

Lesson Summary

Let (x_1, y_1) and (x_2, y_2) be the coordinates of two distinct points on the graph of a line l. We find the slope of the line by:

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Where this version of the slope formula, using coordinates of x and y instead of p and r, is a commonly accepted version.

As soon as you multiply the slope by the denominator of the fraction above you get the following equation:

$$m(x_2 - x_1) = y_2 - y_1$$

This form of an equation is referred to as the point-slope form of a linear equation.

Given a known (x, y), then the equation is written as

$$m(x - x_1) = (y - y_1)$$

The following is slope-intercept form of a line:

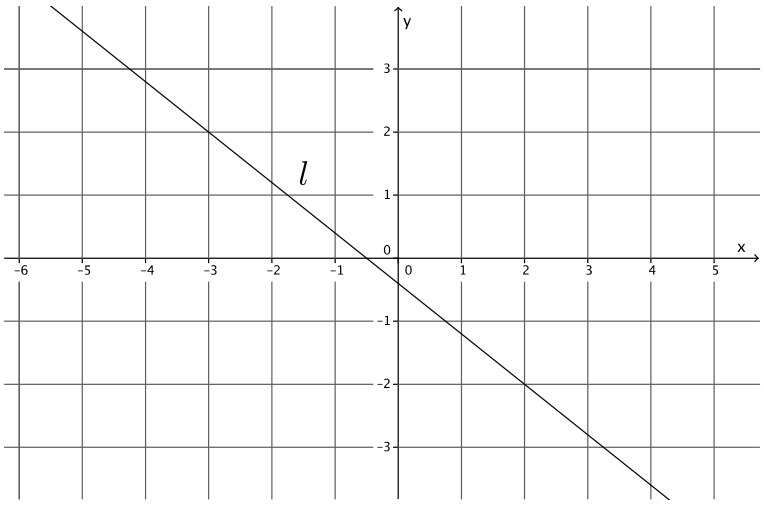
$$y = mx + b$$

In this equation, m is slope and $(0, b)$ is the y-intercept.

To write the equation of a line you must have two points, one point and slope, or a graph of the line.

Problem Set

1. Write the equation for the line l shown in the graph.



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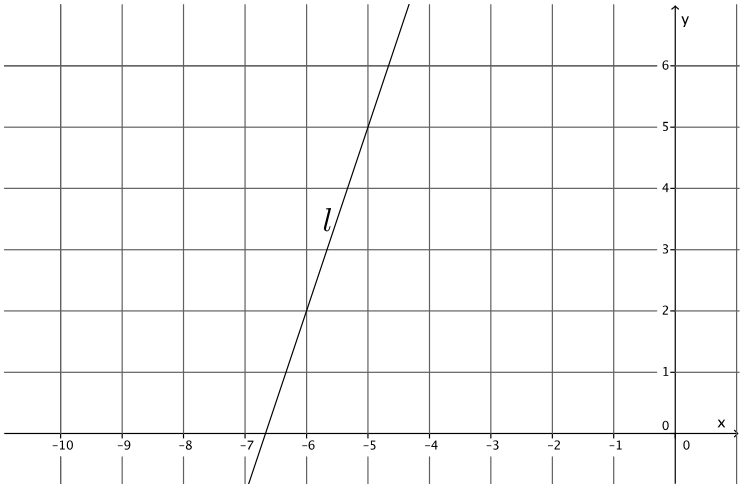

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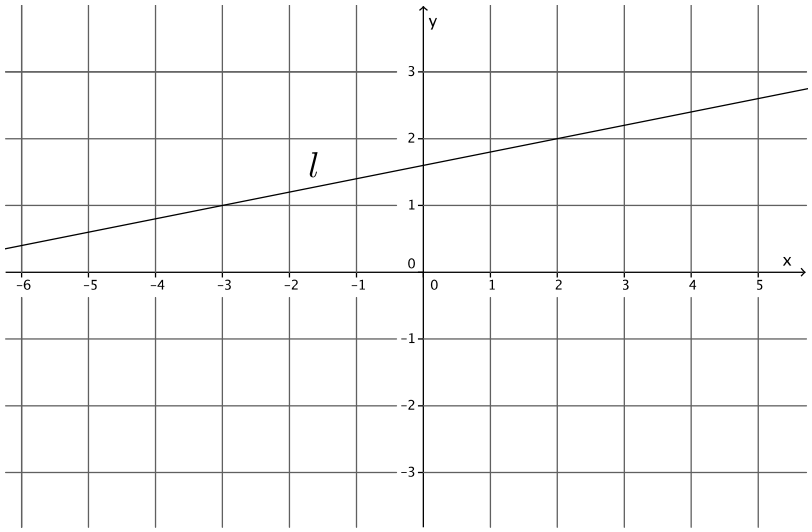
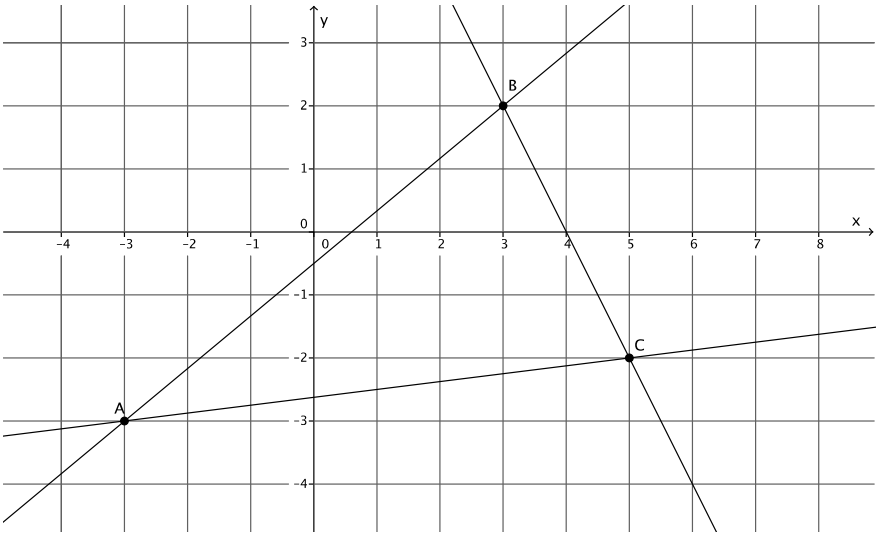


4. Triangle $\triangle ABC$ is made up line segments formed from the intersection of lines L_{AB}, L_{BC}, and L_{AC}. Write the equations that represents the lines that make up the triangle.



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 $(3, 7)$.