Name: _____

Date: _____

Period: _____

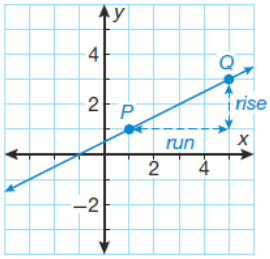
Geometry Lesson 16

Objective: TSW find slopes and equations of lines.

_____ Equation - An equation whose graph is a line. Some examples are:

$y = 3x - 1$ $\quad 2x + 5y = 7$ $\quad 10 = 2x$ $\quad \frac{x}{4} + \frac{y}{13} = 1$

*T*he variables in linear equations never have exponents other than 1. Linear equations connect algebra (equations in *x* and *y*) to geometry (lines in a coordinate plane).

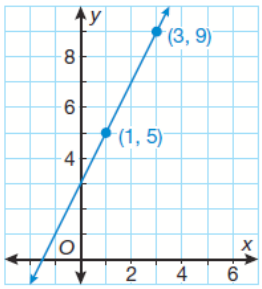


The _____ from *P* to *Q* is the *vertical* change between *P* and *Q*, and equals $y_2 - y_1$.
The _____ from *P* to *Q* is the *horizontal* change between *P* and *Q*, and equals $x_2 - x_1$.

_____ - The ratio of the vertical change (rise) between two points on a line to the horizontal change (run). $slope = m = \frac{y_2 - y_1}{x_2 - x_1}$

Example 1 Finding the Slope of a Line

SOLUTION



_____ line - The rise is always zero, so the slope is 0.

Vertical line - The run is zero, so the slope is undefined because division by zero is undefined.

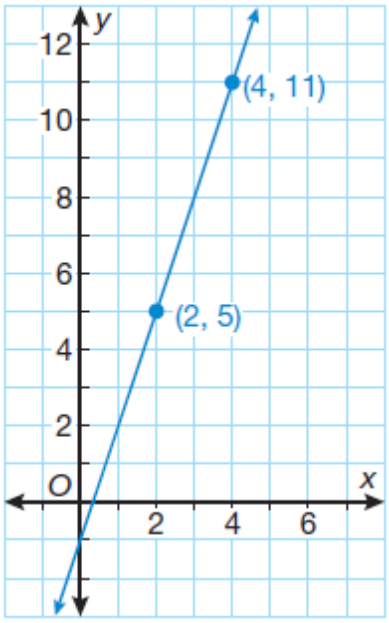
The slope-intercept form of a linear equation is a way of writing a linear equation using the slope (*m*) and the *y*-intercept (*b*) of the line. This way of writing the equation has the form

_____.

Example 2 Writing the Equation of a Line

a. Use this graph of a line to write its equation.

SOLUTION



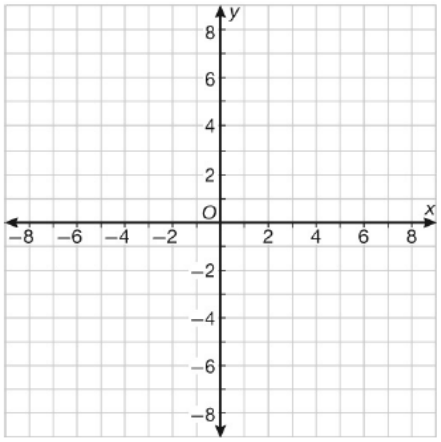
b. Write the equation of the line that has slope $\frac{2}{3}$ and passes through (-2, 4).

SOLUTION

Example 3 Graphing a Linear Equation

a. Graph the line that has the equation $y = -5x + 3$.

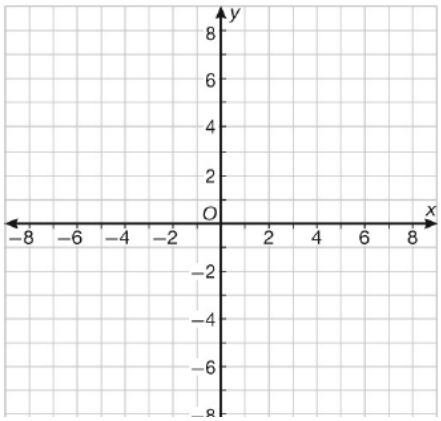
SOLUTION



b. Graph the line that has the equation $2y - 4x = 7$.

SOLUTION

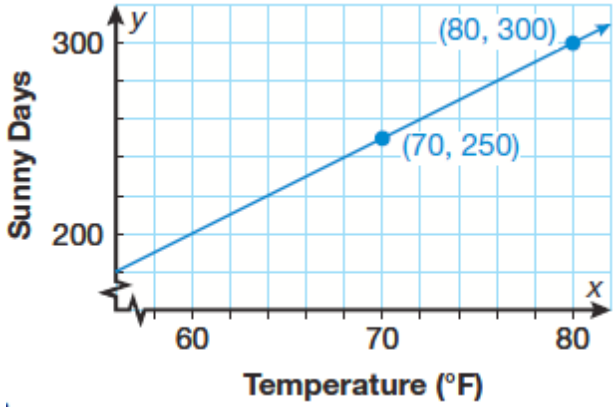
The equation is not in slope-intercept form. Convert it to slope-intercept form.



Example 4 Application: Meteorology

Kim believes that there is a linear relationship between the average July temperature in the city of Brightdale in a particular year, and the number of days of sunshine Brightdale enjoys that year. She defines x to be the average July temperature (daily high, in Fahrenheit), and y to be the number of days of sunshine.

Kim's model is shown on this graph.



a. Determine the slope of the graph. What does the slope represent?

SOLUTION

b. Write an equation for Kim's model.

SOLUTION

c. Use the equation to predict the average July temperature if there are 280 days of sunshine.
SOLUTION

You Try!!!
e.Write the equation of the line that passes through (0, -2) and (5, 2).

g.Graph the line with the equation $3x + y = 6$.