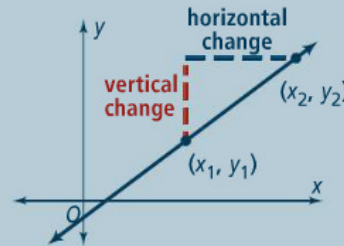


You can describe movement in a coordinate plane by describing how far you need to move vertically and how far you need to move horizontally to get from one point to another point.

Essential Understanding Consider a nonvertical line in the coordinate plane. If you move from any point on the line to any other point on the line, the ratio of the vertical change to the horizontal change is constant. That constant ratio is the slope of the line.

The **slope** of a nonvertical line is the ratio of the vertical change to the horizontal change between two points. You can calculate slope by finding the ratio of the difference in the y -coordinates to the difference in the x -coordinates for any two points on the line.



Take note

Key Concept Slope

The slope of a nonvertical line through points (x_1, y_1) and (x_2, y_2) is the ratio of the vertical change to the corresponding horizontal change.

$$\text{slope} = \frac{\text{vertical change (rise)}}{\text{horizontal change (run)}} = \frac{y_2 - y_1}{x_2 - x_1}, \text{ where } x_2 - x_1 \neq 0$$

A Practice Find the slope of the line through each pair of points.

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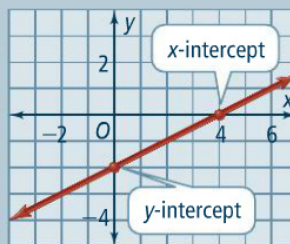
1. $(1, 6)$ and $(8, -1)$

2. $(-2, -1)$ and $(8, -3)$

A function whose graph is a line is a **linear function**. You can represent a linear function with a **linear equation**, such as $y = 6x - 4$. A solution of a linear equation is any ordered pair (x, y) that makes the equation true.

A special form of a linear equation is called **slope-intercept form**.

An **intercept** of a line is a point where a line crosses an axis. The **y -intercept** of a nonvertical line is the point at which the line crosses the y -axis. The **x -intercept** of a nonhorizontal line is the point at which the line crosses the x -axis.



Take note

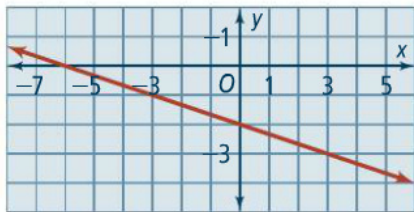
Key Concept Slope-Intercept Form

The **slope-intercept form** of an equation of a line is $y = mx + b$, where m is the slope of the line and $(0, b)$ is the y -intercept.

A Practice Write an equation for each line.

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3.



4. $m = -5$, and the y -intercept is $(0, -7)$.

A Practice Write each equation in slope-intercept form. Then find the slope and y -intercept of each line.

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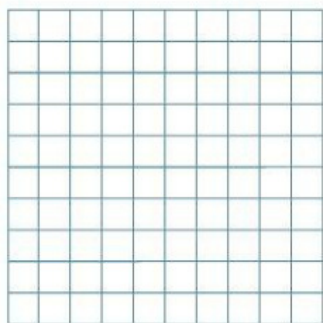
5. $-3x + 2y = 7$

6. $-\frac{1}{2}x - y = \frac{3}{4}$

A Practice Graph each equation.

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7. $y = -4x + 5$



8. $-2x + 5y = -10$

