

5.3 Write Linear Equations in Point-Slope Form



TEKS A.1.C, A.5.A,
A.6.D, A.7.A

Before

You wrote linear equations in slope-intercept form.

Now

You will write linear equations in point-slope form.

Why?

So you can model sports statistics, as in Ex. 43.

Key Vocabulary

- point-slope form

Consider the line that passes through the point $(2, 3)$ with a slope of $\frac{1}{2}$.

Let (x, y) where $x \neq 2$ be another point on the line. You can write an equation relating x and y using the slope formula, with $(x_1, y_1) = (2, 3)$ and $(x_2, y_2) = (x, y)$.

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

Write slope formula.

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

Substitute $\frac{1}{2}$ for m , 3 for y_1 , and 2 for x_1 .

$$\frac{1}{2}(x - 2) = y - 3$$

Multiply each side by $(x - 2)$.

USE POINT-SLOPE FORM

When an equation is in point-slope form, you can read the x - and y -coordinates of a point on the line and the slope of the line.

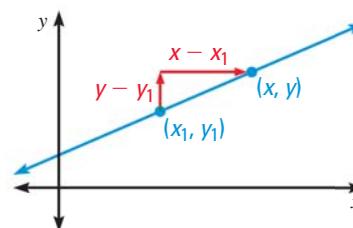
The equation in *point-slope form* is $y - 3 = \frac{1}{2}(x - 2)$.

KEY CONCEPT

Point-Slope Form

The **point-slope form** of the equation of the nonvertical line through a given point (x_1, y_1) with a slope of m is $y - y_1 = m(x - x_1)$.

For Your Notebook



EXAMPLE 1 Write an equation in point-slope form

Write an equation in point-slope form of the line that passes through the point $(4, -3)$ and has a slope of 2.

$$y - y_1 = m(x - x_1) \quad \text{Write point-slope form.}$$

$$y + 3 = 2(x - 4) \quad \text{Substitute 2 for } m, 4 \text{ for } x_1, \text{ and } -3 \text{ for } y_1.$$



GUIDED PRACTICE for Example 1

- Write an equation in point-slope form of the line that passes through the point $(-1, 4)$ and has a slope of -2 .