4.6 Model Direct Variation

TEKS A.6.G

Before You wrote and graphed linear equations.

Now You will write and graph direct variation equations.

Why? So you can model distance traveled, as in Ex. 40.

Key Vocabulary
- **direct variation**
- **constant of variation**

Two variables x and y show **direct variation** provided $y = ax$ and $a \neq 0$. The nonzero number a is called the **constant of variation**, and y is said to *vary directly* with x.

The equation $y = 5x$ is an example of direct variation, and the constant of variation is 5. The equation $y = x + 5$ is *not* an example of direct variation.

EXAMPLE 1 Identify direct variation equations

Tell whether the equation represents direct variation. If so, identify the constant of variation.

a. $2x - 3y = 0$ **b.** $-x + y = 4$

Solution

To tell whether an equation represents direct variation, try to rewrite the equation in the form $y = ax$.

a. $2x - 3y = 0$ Write original equation.

$-3y = -2x$ Subtract $2x$ from each side.

$y = \frac{2}{3}x$ Simplify.

▶ Because the equation $2x - 3y = 0$ can be rewritten in the form $y = ax$, it represents direct variation. The constant of variation is $\frac{2}{3}$.

b. $-x + y = 4$ Write original equation.

$y = x + 4$ Add x to each side.

▶ Because the equation $-x + y = 4$ cannot be rewritten in the form $y = ax$, it does not represent direct variation.

GUIDED PRACTICE for Example 1

Tell whether the equation represents direct variation. If so, identify the constant of variation.

1. $-x + y = 1$ **2.** $2x + y = 0$ **3.** $4x - 5y = 0$