2.5 Model Direct Variation

Before	You wrote and graphed linear equations.
Now	You will write and graph direct variation equations.
Why?	So you can model animal migration, as in Ex. 44.

Key Vocabulary
• direct variation
• constant of variation

### KEY CONCEPT   *For Your Notebook*

Direct Variation

Equation The equation $y = ax$ represents **direct variation** between x and y, and y is said to *vary directly* with x. The nonzero constant a is called the **constant of variation**.

Graph The graph of a direct variation equation $y = ax$ is a line with slope a and y-intercept 0.

The family of direct variation graphs consists of lines through the origin, such as those shown.

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

$y = -x$
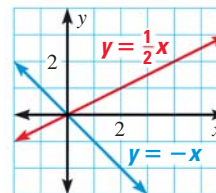
EXAMPLE 1   Write and graph a direct variation equation

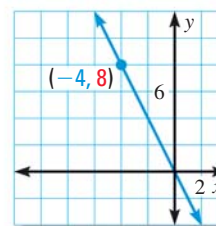**Write and graph a direct variation equation that has (−4, 8) as a solution.**

Solution

Use the given values of x and y to find the constant of variation.

$y = ax$ **Write direct variation equation.**

$8 = a(-4)$ **Substitute 8 for *y* and −4 for *x*.**

$-2 = a$ **Solve for *a*.**

▶ Substituting −2 for a in $y = ax$ gives the direct variation equation $y = -2x$. Its graph is shown.

(−4, 8)

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✓ **GUIDED PRACTICE**   for Example 1

Write and graph a direct variation equation that has the given ordered pair as a solution.

  1. (3, −9)   **2.** (−7, 4)   **3.** (5, 3)   **4.** (6, −2)