RATIOS The direct variation equation $y = ax$ can be rewritten as $\frac{y}{x} = a$ for $x \neq 0$. So, in a direct variation, the ratio of y to x is constant for all nonzero data pairs (x, y).

EXAMPLE 5 Use a direct variation model

ONLINE MUSIC The table shows the cost C of downloading s songs at an Internet music site.

Number of songs, s	Cost, C (dollars)
3	2.97
5	4.95
7	6.93

a. Explain why C varies directly with s.

b. Write a direct variation equation that relates s and C.

CHECK RATIOS For real-world data, the ratios may not be exactly equal. You may still be able to use a direct variation model when the ratios are approximately equal.

Solution

a. To explain why C varies directly with s, compare the ratios $\frac{C}{s}$ for all data pairs (s, C): $\frac{2.97}{3} = \frac{4.95}{5} = \frac{6.93}{7} = 0.99$.

Because the ratios all equal 0.99, C varies directly with s.

b. A direct variation equation is $C = 0.99s$.

GUIDED PRACTICE for Example 5

7. WHAT IF? In Example 5, suppose the website charges a total of \$1.99 for the first 5 songs you download and \$.99 for each song after the first 5. Is it reasonable to use a direct variation model for this situation? *Explain*.

4.6 EXERCISES

HOMEWORK KEY

- = **WORKED-OUT SOLUTIONS** on p. WS1 for Exs. 7, 21, and 43
- = **TAKS PRACTICE AND REASONING** Exs. 9, 43, 44, 46, and 48
- = **MULTIPLE REPRESENTATIONS** Exs. 45

SKILL PRACTICE

1. VOCABULARY Copy and complete: Two variables x and y show __?__ provided $y = ax$ and $a \neq 0$.

2. WRITING A line has a slope of -3 and a y-intercept of 4. Is the equation of the line a direct variation equation? *Explain*.

EXAMPLE 1 on p. 253 for Exs. 3–10

IDENTIFYING DIRECT VARIATION EQUATIONS **Tell whether the equation represents direct variation. If so, identify the constant of variation.**

3. $y = x$

4. $y = 5x - 1$

5. $2x + y = 3$

6. $x - 3y = 0$

7. $8x + 2y = 0$

8. $2.4x + 6 = 1.2y$