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.

- **a.** Explain why *C* varies directly with *s*.
- **b.** Write a direct variation equation that relates *s* and *C*.

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

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.

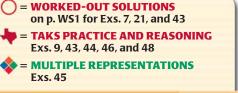
b. A direct variation equation is C = 0.99s.

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



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