PRODUCTS By multiplying both sides of $y = \frac{a}{x}$ by x, you can write the equation as $xy = a$. This means that a set of ordered pairs (x, y) shows inverse variation if all the products xy are constant.

EXAMPLE 5 Write an inverse variation equation

Tell whether the table represents inverse variation. If so, write the inverse variation equation.

x	-5	-3	4	8	24
y	2.4	4	-3	-1.5	-0.5

Solution

Find the products xy for all pairs (x, y):

$-5(2.4) = -12 \quad -3(4) = -12 \quad 4(-3) = -12 \quad 8(-1.5) = -12 \quad 24(-0.5) = -12$

The products are equal to the same number, -12. So, y varies inversely with x.

▶ The inverse variation equation is $xy = -12$, or $y = \frac{-12}{x}$.

EXAMPLE 6 TAKS REASONING: Multi-Step Problem

THEATER A theater company plans to hire people to build a stage set. The work time t (in hours per person) varies inversely with the number p of people hired. The company estimates that 25 people working for 300 hours each can complete the job. Find the work time per person if the company hires 30 people.

Solution

STEP 1 **Write** the inverse variation equation that relates p and t.

$t = \frac{a}{p}$ Write inverse variation equation.

$300 = \frac{a}{25}$ Substitute 25 for p and 300 for t.

$7500 = a$ Multiply each side by 25.

The inverse variation equation is $t = \frac{7500}{p}$.

STEP 2 **Find** t when $p = 30$: $t = \frac{7500}{p} = \frac{7500}{30} = 250$.

▶ If 30 people are hired, the work time per person is 250 hours.

GUIDED PRACTICE for Examples 5 and 6

7. Tell whether the ordered pairs $(-5, 2)$, $(-4, 2.5)$, $(8, -1.25)$, and $(20, -0.5)$ represent inverse variation. If so, write the inverse variation equation.

8. **WHAT IF?** In Example 6, suppose the theater company estimates that 20 people working for 270 hours each can complete the job. Find the work time per person if the company hires 30 people.