

Develop Using Unit Rates to Find Equivalent Ratios

► Read and try to solve the problem below.



Ashwini jogs on the track at her school. She uses a watch to track her progress. At this rate, how long will it take her to jog 16 laps?

TRY IT



Math Toolkit double number lines, grid paper

$$\frac{15 \text{ min}}{6 \text{ laps}} = \frac{2.5 \text{ min}}{1 \text{ lap}}$$

$$\frac{2.5 \text{ min}}{1 \text{ lap}} = \frac{40 \text{ min}}{16 \text{ laps}}$$

$$\begin{array}{r} 2.5 \\ 6 \overline{) 15.0} \\ \underline{-12} \\ 30 \end{array}$$

$$\begin{array}{r} 25 \\ 16 \times 16 \\ \underline{150} \\ 250 \\ \underline{400} \end{array}$$

It will take Ashwini 40 min to jog 16 laps

DISCUSS IT

Ask: How does your model show Ashwini's rate?

Share: My model shows Ashwini's rate ...

DISCUSS IT*continued*

- Explore different ways to understand how to use a unit rate to find equivalent ratios.

Ashwini jogs on the track at her school. She uses a watch to track her progress. It takes her 15 minutes to jog 6 laps. At this rate, how long will it take her to jog 16 laps?

Model It

You can use a table of equivalent ratios to solve the problem.

	Laps	Minutes	
$\div 6$	6	15	$\div 6$
$\times 16$	1	2.5	$\times 16$
	16	?	

Model It

You can find the unit rate and then use it to find equivalent ratios.

Divide the numbers in the ratio 15 : 6 to find the unit rate for minutes per lap.

$$\begin{array}{l} \text{minutes} \rightarrow \frac{15}{6} = \frac{5}{2} = 2.5 \\ \text{laps} \rightarrow 6 \end{array}$$

Multiply the **number of laps** by the **unit rate** for minutes per lap.

Laps	Minutes
6	15
16	?

$\times 2.5$

CONNECT IT

- Use this page to deepen your understanding of using a unit rate to find equivalent ratios.

1 Talk About It

- a. Look at the table in the first **Model It**. Where do you see the unit rate for the ratio of minutes to laps? How is the unit rate found?

The middle row with the 1 for laps shows the unit rate of 2.5. The laps were divided by itself (6) to get to 1 lap.

- b. How can you use the unit rate to find the total number of minutes it takes Ashwini to run any number of laps?

You can multiply the one lap and the 2.5 by however many total laps you want to get to.

2 Show What You Know

Explain how a unit rate for a given ratio relates to the unit rate of any equivalent ratio. Explain how you can use the unit rate to find an equivalent ratio.

Equivalent ratios have the same unit rates. You can multiply or divide by the unit rate to find the missing quantity in an equivalent ratio.

- 3 **Reflect** Think about all the models and strategies you have discussed today. Describe how one of them helped you better understand how to use a unit rate to find equivalent ratios.

Apply It

► Use what you learned to solve these problems.

- 4 Alejandro buys chicken for a barbecue. At the rate shown in the Weekly Special, what does 7 lb of chicken cost? Show your work.



$$\frac{\$5}{4 \text{ lb}} = \frac{\$1.25}{1 \text{ lb}}$$

$$\frac{1.25}{1 \text{ lb}} = \frac{\$8.75}{7 \text{ lb}}$$

$$\begin{array}{r} 1.25 \\ 4 \overline{) 5.00} \\ \underline{4 } \\ 10 \\ \underline{8} \\ 20 \end{array}$$

$$\begin{array}{r} 8 \\ 125 \\ \times 7 \\ \hline 875 \end{array}$$

SOLUTION 7 lbs of chicken will cost \$8.75

- 5 Look at problem 7. How much chicken can Alejandro buy for \$8? Show your work.

$$\frac{4 \text{ lb}}{\$5} = \frac{0.8 \text{ lb}}{\$1}$$

$$\frac{0.8 \text{ lb}}{\$1} = \frac{6.4 \text{ lb}}{\$8}$$

$$\begin{array}{r} 0.8 \\ 5 \overline{) 4.0} \end{array}$$

$$\begin{array}{r} 8 \\ \times 8 \\ \hline 64 \end{array}$$

SOLUTION Alejandro can buy 6.4 lb for \$8

- 6 Anica volunteers to fold T-shirts for the runners at a marathon. She folds 8 T-shirts every 6 minutes. At this rate, how many T-shirts does Anica fold in 45 minutes? Show your work.

$$\frac{8 \text{ shirts}}{6 \text{ min}} = \frac{1 \frac{1}{3} \text{ shirts}}{1 \text{ min}}$$

$$\frac{1 \frac{1}{3} \text{ shirt}}{1 \text{ min}} = \frac{60 \text{ shirts}}{45 \text{ min}}$$

$$\begin{array}{r} 1.3 \\ 6 \overline{) 8.0} \\ \underline{6} \\ 20 \\ \underline{18} \\ 20 \end{array}$$

$$\begin{array}{r} 45 \cdot 1 \frac{1}{3} \\ 15 \overline{) 45} \cdot \frac{4}{3} \\ \underline{1} \end{array}$$

$$\begin{array}{r} 60 \\ 1 \end{array}$$

SOLUTION Anica can fold 60 T-shirts in 45 min.