

Lesson 3 Reteach

Convert Unit Rates

Unit ratios and their reciprocals can be used to convert rates. Sometimes you have to multiply more than once.

Example

The speed limit on the interstate is 65 miles per hour. How many feet per minute is the speed limit?

Because the unit of miles must divide out, use the unit ratio $\frac{5,280 \text{ ft}}{1 \text{ mi}}$ because the unit of miles is in the denominator. Use $\frac{1 \text{ h}}{60 \text{ min}}$ to convert from hours to minutes.

$$\begin{aligned} \frac{65 \text{ mi}}{1 \text{ h}} &= \frac{65 \text{ mi}}{1 \text{ h}} \cdot \frac{5,280 \text{ ft}}{1 \text{ mi}} \cdot \frac{1 \text{ h}}{60 \text{ min}} && \text{Multiply by the appropriate ratios.} \\ &= \frac{65 \cancel{\text{mi}}}{1 \cancel{\text{h}}} \cdot \frac{5,280 \text{ ft}}{1 \cancel{\text{mi}}} \cdot \frac{1 \cancel{\text{h}}}{60 \text{ min}} && \text{Divide out common units.} \\ &= \frac{65 \cdot 5,280 \text{ ft} \cdot 1}{1 \cdot 1 \cdot 60 \text{ min}} = \frac{343,200 \text{ ft}}{60 \text{ min}} \text{ or } \frac{5,720 \text{ ft}}{1 \text{ min}} && \text{Simplify.} \end{aligned}$$

The speed limit is 5,720 feet per minute.

Exercises

Convert each rate.

1. $10 \text{ mi/h} = \underline{880} \text{ ft/min}$

2. $35 \text{ cm/sec} = \underline{21} \text{ m/min}$

3. $4.5 \text{ mi/h} = \underline{6.6} \text{ ft/sec}$

4. **WALK** Tina walks at a rate of 180 feet per minute. How many feet per second does Tina walk? **3 ft/s**

5. **TRAVELING** A car is traveling at a rate of 55 miles per hour. How many feet per hour does the car travel? **290,400 ft/h**