

Converting Measures

The **U.S. customary system** is a system of measurement that contains units for length, capacity, and weight. The **metric system** is a decimal system of measurement, based on powers of 10, that contains units for length, capacity, and mass. To convert from one unit of measure to another, multiply by one or more *conversion factors*. A **conversion factor** is a rate that equals 1 and can be written using fraction notation. A list of equivalent measures is located in the back of your textbook. There are two different conversion factors for each statement of equivalent measures.

Statement of Equivalent Measures	Conversion Factors
1 in. = 2.54 cm	$\frac{1 \text{ in.}}{2.54 \text{ cm}}$ and $\frac{2.54 \text{ cm}}{1 \text{ in.}}$

Example 1 Convert 24 quarts to gallons.

$$24 \cancel{\text{qt}} \cdot \frac{1 \text{ gal}}{4 \cancel{\text{qt}}} = \frac{24 \cdot 1 \text{ gal}}{4} = 6 \text{ gal}$$

▶ So, 24 quarts is 6 gallons.

Example 2 Convert 6.5 meters to feet.

$$6.5 \cancel{\text{m}} \cdot \frac{3.28 \text{ ft}}{1 \cancel{\text{m}}} = 6.5 \cdot 3.28 \text{ ft} \approx 21.32 \text{ ft}$$

▶ So, 6.5 meters is about 21.32 feet.

Example 3 A sports car reaches a maximum speed of 210 miles per hour. What is the speed in feet per second?

$$\frac{210 \cancel{\text{mi}}}{1 \cancel{\text{h}}} \left(\frac{5280 \text{ ft}}{1 \cancel{\text{mi}}} \right) \left(\frac{1 \cancel{\text{h}}}{3600 \text{ sec}} \right) = \frac{210 \cdot 5280 \text{ ft}}{3600 \text{ sec}} = \frac{1,108,800 \text{ ft}}{3600 \text{ sec}} = \frac{308 \text{ ft}}{1 \text{ sec}}$$

▶ The speed is 308 feet per second.

Practice

Check your answers at BigIdeasMath.com.

Copy and complete the statement. Round to the nearest hundredth, if necessary.

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|--|--|--|--|
| 1. 36 oz = <input type="text"/> lb | 2. 3400 mL = <input type="text"/> L | 3. 18 pt = <input type="text"/> c | 4. 7 kg = <input type="text"/> g |
| 5. 246 ft = <input type="text"/> yd | 6. 65 cm = <input type="text"/> mm | 7. 8.5 mi = <input type="text"/> ft | 8. 8 h = <input type="text"/> sec |
| 9. 20 cm \approx <input type="text"/> in. | 10. 150 lb \approx <input type="text"/> kg | 11. 2.5 km \approx <input type="text"/> mi | 12. 4 gal \approx <input type="text"/> L |
| 13. $6\frac{1}{2}$ ft \approx <input type="text"/> m | 14. 12 L \approx <input type="text"/> qt | 15. 2500 mL \approx <input type="text"/> c | 16. 24 oz \approx <input type="text"/> g |

- ENGINE COOLANT** An automobile engine holds 5.8 liters of coolant. You have 2 gallons of coolant. Do you have enough coolant to fill the engine? Explain.
- HUMMINGBIRD** A hummingbird's heart rate is about 1250 beats per minute. What is the heart rate in beats per second?
- EROSION** A shoreline is eroding at a rate of 6.8 meters per year. What is the erosion rate in feet per week?
- SWIMMING POOL** A swimming pool is draining at a rate of 10 fluid ounces per second. What is the drainage rate in gallons per hour?