

Challenge: Skills and Applications

For use with pages 457–464

A *conversion factor* is a ratio in which the numerator and denominator are equivalent measurements, expressed in different units. For example:

$$\frac{12 \text{ in.}}{1 \text{ ft}} \text{ and } \frac{1 \text{ ft}}{12 \text{ in.}} \text{ are conversion factors because } 12 \text{ in.} = 1 \text{ ft.}$$

$$\frac{1 \text{ kg}}{1000 \text{ g}} \text{ and } \frac{1000 \text{ g}}{1 \text{ kg}} \text{ are conversion factors because } 1 \text{ kg} = 1000 \text{ g.}$$

In Exercises 1–6, use the given information to write two conversion factors.

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|-------------------|----------------------------|
| 1. 1 mi = 5280 ft | 2. 1 ton = 2000 lb |
| 3. 10 mm = 1 cm | 4. 1000 m = 1 km |
| 5. 1 lb = 16 oz | 6. 1 km \approx 0.621 mi |

In Exercises 7–14, multiply by an appropriate conversion factor to convert the quantity to the given units.

When multiplying by a conversion factor, units that appear in both a numerator and a denominator can be divided out in the same manner as variables are divided out.

Example: 42 in., to feet: $42 \text{ in.} = 42 \cancel{\text{in.}} \cdot \frac{1 \text{ ft}}{12 \cancel{\text{in.}}} = 3.5 \text{ ft}$

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|--------------------|-------------------------|
| 7. 3.7 km, to m | 8. 135 lb, to tons |
| 9. 567 mm, to cm | 10. 324 oz, to lb |
| 11. 126 in., to ft | 12. 300 km, to mi |
| 13. 12.7 mi, to ft | 14. 18 days, to seconds |
15. The distance from Memphis, Tennessee, to Louisville, Kentucky, is about 320 miles. Convert this distance to kilometers.
16. The diameter of Venus at the equator is about 12,100 kilometers. Convert this distance to miles.
17. The rotation period of Saturn is about $10\frac{2}{3}$ hours. Convert this length of time to minutes.
18. The height of Mount Everest is about 29,000 feet. Convert this height to miles.
19. The Statue of Liberty weighs 225 tons. Convert this weight to ounces.