

Whenever you work problems, remember the following points:

- Always include the units (a measurement always has two parts: a number *and* a unit).
- Cancel units as you carry out the calculations.
- Check that your final answer has the correct units. If it doesn't, you have done something wrong.
- Check that your final answer has the correct number of significant figures.
- Think about whether your answer makes sense.

Utilizing Dimensional Analysis (Factor-Label Method) and the conversion units provided below (as well as those commonly known), compute the following. **Show your set up. Show both the calculator and justified answers (sig figs).**

- 35.2 kilograms = ? grams  $\frac{35.2 \text{ kg}}{1 \text{ kg}} \times \frac{1000 \text{ g}}{1 \text{ kg}} = 35,200 \text{ g or } 3.52 \times 10^4 \text{ g}$
- 334.6 milligrams = ? grams  $\frac{334.6 \text{ mg}}{1000 \text{ mg}} \times \frac{1 \text{ g}}{1 \text{ g}} = 0.3346 \text{ g}$
- 25.4 centimeters = ? meters  $\frac{25.4 \text{ cm}}{100 \text{ cm}} \times \frac{1 \text{ m}}{1 \text{ m}} = 0.254 \text{ m}$
- 0.234 centimeters = ? millimeters  $\frac{0.234 \text{ cm}}{1 \text{ cm}} \times \frac{10 \text{ mm}}{1 \text{ cm}} = 2.34 \text{ mm}$
- 224.0 milliliters = ? liters  $\frac{224.0 \text{ mL}}{1000 \text{ mL}} \times \frac{1 \text{ L}}{1 \text{ L}} = 0.2240 \text{ L}$
- 11.2 liters = ? milliliters  $\frac{11.2 \text{ L}}{1 \text{ L}} \times \frac{1000 \text{ mL}}{1 \text{ L}} = 11,200 \text{ mL}$
- 32.8 grams = ? ounces  $\frac{32.8 \text{ g}}{28.34 \text{ g}} \times \frac{1 \text{ oz.}}{1 \text{ oz.}} = 1.157374735 = 1.16 \text{ oz.}$
- 39.37 millimeters = ? inches  $\frac{39.37 \text{ mm}}{25.40 \text{ mm}} \times \frac{1 \text{ in.}}{1 \text{ in.}} = 1.55 = 1.550 \text{ in.}$
- 22.4 liters = ? quarts  $\frac{22.4 \text{ L}}{1 \text{ L}} \times \frac{1.057 \text{ qt.}}{1 \text{ L}} = 23.6768 = 23.7 \text{ qt.}$
- 427 grams = ? pounds  $\frac{427 \text{ g}}{453.6 \text{ g}} \times \frac{1 \text{ lb}}{1 \text{ lb}} = 0.941358025 = 0.941 \text{ lbs.}$
- 528 centimeters = ? feet  $\frac{528 \text{ cm}}{2.540 \text{ cm}} \times \frac{1 \text{ in.}}{1 \text{ in.}} \times \frac{1 \text{ ft.}}{12 \text{ in.}} = 17.32283465 = 17.3 \text{ ft.}$
- 382 milliliters = ? gallons  $\frac{382 \text{ mL}}{1000 \text{ mL}} \times \frac{1 \text{ L}}{1 \text{ L}} \times \frac{1 \text{ qt.}}{0.9463 \text{ L}} \times \frac{1 \text{ gal.}}{4 \text{ qts.}} = 0.10091937 = 0.101 \text{ gal.}$
- 50.0 pounds = ? kilograms  $\frac{50.0 \text{ lbs}}{2.205 \text{ kg}} \times \frac{1 \text{ kg}}{1 \text{ kg}} = 22.68 = 22.7 \text{ kg}$
- 16.0 fluid ounces = ? milliliters  $\frac{16.0 \text{ fl. oz.}}{1 \text{ fl. oz.}} \times \frac{29.57 \text{ mL}}{1 \text{ fl. oz.}} = 473.12 = 473 \text{ mL}$
- 7.054 ounces = ? grams  $\frac{7.054 \text{ oz.}}{1 \text{ oz.}} \times \frac{28.34 \text{ g}}{1 \text{ oz.}} = 199.91036 = 199.9 \text{ g}$
- 1.5 feet = ? centimeters  $\frac{1.5 \text{ ft.}}{1 \text{ ft.}} \times \frac{12 \text{ in.}}{1 \text{ ft.}} \times \frac{2.540 \text{ cm.}}{1 \text{ in.}} = 45.72 = 46 \text{ cm}$
- 248 gallons = ? liters  $\frac{248 \text{ gal}}{1 \text{ gal}} \times \frac{4 \text{ qt.}}{1 \text{ gal}} \times \frac{0.9463 \text{ L}}{1 \text{ qt.}} = 938.7296 = 939 \text{ L}$
- 32.4 yards = ? meters  $\frac{32.4 \text{ yds.}}{1 \text{ yd.}} \times \frac{36 \text{ in.}}{1 \text{ yd.}} \times \frac{2.540 \text{ cm}}{1 \text{ in.}} \times \frac{1 \text{ m}}{100 \text{ cm}} = 29.62656 = 29.6 \text{ m}$

LENGTH	MASS	VOLUME
1 inch = 2.540 cm	1 lb = 453.6 g	1 qt = 0.9463 L
1 mi = 1.609 km	1 kg = 2.205 lb	1 L = 1.057 qt
36 in. = 1 yd	1 oz = 28.34 g	1 fl. oz = 29.57 mL
1 mi = 5280 ft	16 oz = 1 lb	1 gal = 4 qt
		32 oz = 1 qt

Kilo (k)	$10^3 = 1000$	Milli- (m)	$10^{-3} = 0.001$	Pico- (p)	$10^{-12} = 0.000000000001$
Deci- (d)	$10^{-1} = 0.1$	Micro- ( $\mu$ )	$10^{-6} = 0.000001$		
Centi- (c)	$10^{-2} = 0.01$	Nano- (n)	$10^{-9} = 0.000000001$		