



Measurement Conversion

CONVERSION FRACTIONS

Conversion fractions are used in many contexts to convert between different measurement units in a variety of fields.

Example 1: Convert 3 pints to fluid ounces.

Solution: We set up a conversion factor to translate between the unit we have and the unit we want.

We ~~have~~ pints. We must set up a conversion fraction with pints and fluid ounces so that "pints" cancels. We check the table on the next page, and find a column with pints and fluid ounces. The two entries are "1 pint" and "16 fl. oz.", so the conversion equation is 1 pt. = 16 fl. oz. Since we want "pints" to cancel, it goes on the bottom of the fraction:

$$3 \text{ pt.} \times \frac{16 \text{ fl. oz.}}{1 \text{ pt.}} = 48 \text{ fl. oz.}$$

With the conversion fraction, we'll never forget whether we need to multiply or divide.

Example 2: Convert 20 drams to millilitres.

Solution: We don't have a direct conversion from drams to mL (see the table on the next page), but we can still use conversion fractions. We can convert to tablespoons, and then millilitres. (It doesn't have to be tablespoons; anything else that acts as a stepping stone from one to the other will do, although it is best to avoid converting to metric and back again since this can make your calculation less precise.)

$$20 \text{ drams} \times \frac{1 \text{ tbsp.}}{4 \text{ drams}} \times \frac{15 \text{ mL}}{1 \text{ tbsp.}} = (20 \times 15 \div 4) \text{ mL} = 75 \text{ mL}$$

Example 3: There are 5280 feet in a mile, 12 inches in a foot, and according to US law, an inch is exactly 2.54 cm. Convert 12.9 km to miles.

Solution: We can figure this out by using a longer chain of conversions. It doesn't matter how many we use, as long as we remember that we must cancel any unit that we don't want in the end.

$$12.9 \text{ km} \times \frac{1000 \text{ m}}{1 \text{ km}} \times \frac{100 \text{ cm}}{1 \text{ m}} \times \frac{1 \text{ in.}}{2.54 \text{ cm}} \times \frac{1 \text{ ft.}}{12 \text{ in.}} \times \frac{1 \text{ mi.}}{5280 \text{ ft.}} = \frac{12.9 \times 1000 \times 100}{2.54 \times 12 \times 5280} \text{ mi.} = 8.02 \text{ mi.}$$

Example 4: A doctor orders 50 cc of medication X to infuse over 30 min. What is the rate per hour?

Solution: We need to convert the time into hours from minutes:

$$\frac{50 \text{ cc}}{30 \text{ min}} \times \frac{60 \text{ min}}{1 \text{ h}} = (50 \div 30 \times 60) \text{ cc} = 100 \text{ cc}$$