



Note: Some of these conversions required us to round. This may affect your answer depending on how many decimal places a question asks for.

Length and Distance

Unit	Ratio	Unit
millimeters	10mm per 1cm	centimeters
millimeters	25.4mm per 1in	inches
centimeters	2.54cm per 1in	inches
centimeters	100cm per 1m	meters
inches	12in per 1ft	feet
inches	39.3701in per 1m	meters
feet	3ft per 1yd	yards
feet	3.28084ft per 1m	meters
feet	5280ft per 1mi	miles
yards	1.09361yd per 1m	meters
yards	1760yd per 1mi	miles
meters	1000m per 1km	kilometers
meters	1609.344m per 1mi	miles
kilometers	1.60934km per 1mi	miles

Surface Area

Unit	Ratio	Unit
sq mm	100mm ² per 1cm ²	sq cm
sq mm	645.16mm ² per 1in ²	sq in
sq cm	6.4516cm ² per 1in ²	sq in
sq cm	10,000cm ² per 1m ²	sq m
sq in	144in ² per 1ft ²	sq ft
sq in	1,550.00477in ² per 1m ²	sq m
sq ft	9ft ² per 1yd ²	sq yd
sq ft	10.76391ft ² per 1m ²	sq m
sq ft	27,878,400ft ² per 1mi ²	sq mi
sq yd	1.19598yd ² per 1m ²	sq m
sq yd	3,097,600yd ² per 1mi ²	sq mi
sq m	1,000,000m ² per 1km ²	sq km
sq m	2,589,988.11034m ² per 1mi ²	sq mi
sq km	2.58999km ² per 1mi ²	sq mi

Volume(Liquid)

Unit	Ratio	Unit
centiliters	2.95735cL per 1fl oz	fluid ounces
centiliters	10cL per 1dL	deciliters
centiliters	23.6588cL per 1c	cups
fluid ounces	3.3814fl oz per 1dL	deciliters
fluid ounces	8fl oz per 1c	cups
fluid ounces	16fl oz per 1pt	pints
cups	2c per 1pt	pints
cups	4c per 1qt	quarts
cups	4.22675c per 1L	liters
pints	2pt per 1qt	quarts
pints	2.11338pt per 1L	liters
pints	8pt per 1gal	gallons
quarts	1.05669qt per 1L	liters
quarts	4qt per 1gal	gallons
liters	3.78541L per 1gal	gallons
liters	10L per 1daL	decaliters
gallons	2.27021gal per 1daL	decaliters

Mass & Weight

Unit	Ratio	Unit
grams	28.3495g per 1oz	ounces
grams	453.592g per 1lb	pounds
grams	1,000g per 1kg	kilograms
ounces	16oz per 1lb	pounds
ounces	35.274oz per 1kg	kilograms
pounds	2.20462lb per 1kg	kilograms
pounds	2,000lb per 1T	tons
pounds	2204.62lb per 1MT	metric tons
kilograms	907.185kg per 1T	tons
kilograms	1,000kg per 1MT	metric tons

Using Unit Conversion Ratios

When looking to do unit conversions we must look at the ratios on the previous page. Note that the ratios can be written in different ways. For example, the ratio of millimeters over centimeters is $\frac{10mm}{1cm}$. Alternatively, we can write it as centimeters over millimeters, $\frac{1cm}{10mm}$. Our ratio choice depends on what the question is asking for.

Let us continue the same example from above. Suppose we wish to convert $5cm$ to *millimeters*. In this case we choose $\frac{10mm}{1cm}$ since we wish to end in millimeters.

$$5cm \times \frac{10mm}{1cm} = 5\cancel{cm} \times \frac{10mm}{1\cancel{cm}} = 50mm$$

If we wish to convert $500mm$ to *centimeters*, we choose $\frac{1cm}{10mm}$.

$$500mm \times \frac{1cm}{10mm} = 500\cancel{mm} \times \frac{1cm}{10\cancel{mm}} = 50cm$$

NOTE: In the end, units should cancel and we should be left with the unit(s) the question asks for. If things do not cancel properly we may have made a mistake.

Example 1

How many feet are in 10 miles?

What we have is miles, but we want to end up with feet.

$$\frac{10mi}{1} \times \text{---} = \text{---} ft$$

We need our conversion ratio. We know that there are $5280ft$ for every $1mi$. Because we want to end up with feet we choose $\frac{5280ft}{1mi}$.

$$\frac{10mi}{1} \times \frac{5280ft}{1mi} = \frac{10\cancel{mi}}{1} \times \frac{5280ft}{1\cancel{mi}} = 52,800ft$$

Example 2

Convert $27m/s$ to miles per hour (*mph* or *mi/hr*).

We have two conversions we must do. We need to change meters to miles and seconds to hours. So we know the right hand side will look like $\frac{mi}{hr}$.

$$\frac{27m}{1s} \times \text{---} \times \text{---} = \frac{mi}{hr}$$

We know that there are approximately $1609m$ in $1mi$. We also know there are $3600s$ in $1hr$.

$$\frac{27m}{1s} \times \frac{1mi}{1609m} \times \frac{3600s}{1hr} = \frac{27\cancel{m}}{1\cancel{s}} \times \frac{1mi}{1609\cancel{m}} \times \frac{3600\cancel{s}}{1hr} = \frac{97,200mi}{1609hr} \approx 60mph$$