

Calculations involving significant digits.

Adding/Subtracting → round the final answer to the **least precise place value** (from the values used in the calculation)

Multiplying/Dividing → round the final answer to the **least number of significant digits** (from the values used in the calculation)

Metric Conversions

mega	kilo	hecto	deca	base unit	deci	centi	milli	micro
M	k	h	da	g, m	d	c	m	μ
10^6	10^3	10^2	10^1		10^{-1} $(\frac{1}{10})$	10^{-2} $(\frac{1}{10^2})$	10^{-3} $(\frac{1}{10^3})$	10^{-6} $\frac{1}{10^6}$

$\xrightarrow{\times 10^? \text{ (move decimal right)}}$
 $\xleftarrow{\div 10^? \text{ (move decimal left)}}$

Ways to do Metric Conversions:

1. Slide the decimal OK, but might not always be convenient.

$$\underbrace{52.8 \text{ mg}} = 0.0000528 \text{ kg}$$

6 dec places to left

$$0.\underbrace{792 \text{ km}} = 79200 \text{ cm}$$

5 dec places to right

$$\underbrace{425 \text{ nm}} = 0.000000425 \text{ m}$$

9 places to the left

2. Use the prefix (if going to the base unit)

$$685 \text{ n}^{\text{m}} = 685 \times 10^{-9} \text{ m}$$

$$\times 10^{-9} = 6.85 \times 10^{-7} \text{ m}$$

$$85.3 \text{ T}^{\text{m}} = 85.3 \times 10^{12} \text{ m}$$

$$\times 10^{12} = 8.53 \times 10^{13} \text{ m}$$

$$0.00291 \text{ } \mu\text{C} = 0.00291 \times 10^{-6} \text{ C}$$

$$\times 10^{-6} = 2.91 \times 10^{-9}$$

3. Factor Label Method (use conversion factor)

convert: 582 km to m

$$? \text{ m} = 582 \text{ km} \left(\frac{1000 \text{ m}}{1 \text{ km}} \right)$$

← conversion factor.

what we want to know

what we know

$$? \text{ m} = 582000 \text{ m}$$

$$\frac{582 \cdot 1000}{1}$$

Convert 381 km to cm

$$\frac{381 \cdot 1000 \cdot 100}{1}$$

$$? \text{ cm} = 381 \text{ km} \left(\frac{1000 \text{ m}}{1 \text{ km}} \right) \left(\frac{100 \text{ cm}}{1 \text{ m}} \right)$$

$$? \text{ cm} = 38100000 \text{ cm}$$

Convert $105 \frac{\text{km}}{\text{h}}$ to $\frac{\text{m}}{\text{s}}$

$$? \frac{\text{m}}{\text{s}} = 105 \frac{\text{km}}{\text{h}} \left(\frac{1000 \text{ m}}{1 \text{ km}} \right) \left(\frac{1 \text{ h}}{60 \text{ min}} \right) \left(\frac{1 \text{ min}}{60 \text{ s}} \right)$$

on calculator:

$$\frac{105 \cdot 1000}{(60 \cdot 60)}$$

$$? \frac{\text{m}}{\text{s}} = 29.166\bar{6} \frac{\text{m}}{\text{s}}$$

3sd

$$= 29.2 \frac{\text{m}}{\text{s}}$$

m s^{-1}