

Maths for D&T

Cost

Cost of material in a part =
mass of material x cost per unit mass (or cost of material = area of material x cost per unit area)

Labour to make a product =
labour time x charge rate

Total cost of parts in a product =
£ part1 + £ part2 + £ part3 etc.

Total cost to make a product =
cost of parts + cost of materials + labour cost

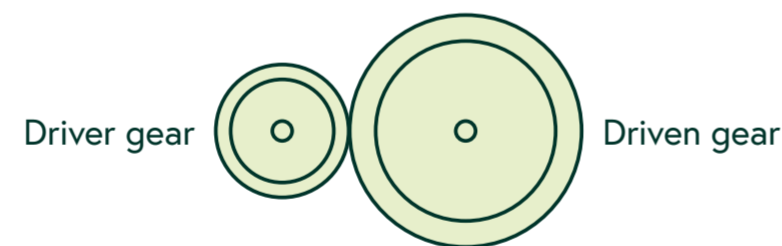
Profit =
sales price – total cost

Fractions, ratios and percentages

A fraction represents a part of a group. It can be presented in the form a/b or as a decimal (e.g. ¼ or 0.25).

A ratio compares two numbers by division. It should normally be shown as the two numbers, e.g. 1:4 or 2:1. Ratios are used to communicate drawing scales or to calculate changes in speed due to gears:

$$\text{Gear ratio} = \frac{\text{number of teeth on driven gear}}{\text{number of teeth on driver gear}} = \frac{N_{\text{driven}}}{N_{\text{driver}}} = \frac{\text{Speed}_{\text{driver}}}{\text{Speed}_{\text{driven}}}$$



$$\text{Percentage} = \frac{\text{number}}{\text{total}} \times \frac{100}{1}$$

$$\% \text{ Profit} = \frac{\text{sales price} - \text{total cost}}{\text{sales price}} \times \frac{100}{1}$$

Handling data

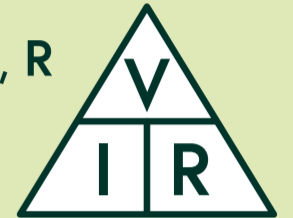
Tables are used to present data

Person number	Length of hand (mm)	Width of hand (mm)
1	213	82
2	178	86
3	195	84
4	201	82
5	177	89
6	182	78
7	170	83
8	189	80
9	210	87
10	185	89
Total	1900	840
Mean	190	84

Ohms Law and resistance

Voltage

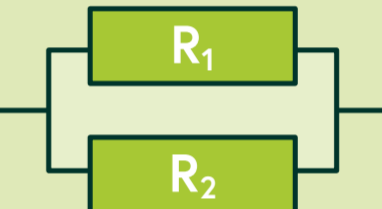
V = current, I x resistance, R
V = IR rearranging this,
I = V/R and R = V/I



For resistors in series:

$$R_T = R_1 + R_2$$


For resistors in parallel:

$$\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2}$$


Standard form

Letter	Word	Multiplier
p	pico	X 10 ⁻¹²
n	nano	X 10 ⁻⁹
μ	micro	X 10 ⁻⁶
m	milli	X 10 ⁻³
k	kilo	X 10 ³
M	mega	X 10 ⁶
G	giga	X 10 ⁹
T	tera	X 10 ¹²