

L1.3 Checking equation rearrangement skills

Try rearranging these equations:

a) $P = \frac{mgh}{t}$ So $g =$

b) $P = \frac{mg}{lw}$ So $l =$

c) $\frac{p_1 V_1}{T_1} = \frac{p_2 V_2}{T_2}$ So $T_1 =$

and

$$V_2 =$$

d) $v = u + at$ So $u =$
and
 $t =$

Answers

a) $P = \frac{mgh}{t}$ So $g = \frac{Pt}{mh}$

b) $P = \frac{mg}{lw}$ So $l = \frac{mg}{Pw}$

c) $\frac{p_1 V_1}{T_1} = \frac{p_2 V_2}{T_2}$ So $T_1 = \frac{p_1 V_1}{p_2 V_2} \times T_2$

and

$\frac{p_1 V_1}{T_1} = \frac{p_2 V_2}{T_2}$ So $V_2 = \frac{p_1 V_1 T_2}{T_1 p_2}$

Notice:

We can move terms diagonally across the equals sign to the other side (from top to bottom, or bottom to top) because there is NO ADDITION OR SUBTRACTION.

Rearranging equations involving addition and subtraction

a) $v = u + at$ $a =$

b) $v^2 = u^2 + 2as$ $u =$

c) Internal energy = Total PE + $\frac{1}{2} mv^2$ $m =$

Now mark / correct your work

a) $v = u + at$ Subtract u from both sides, so... $v - u = at$
Now divide both sides by t , so... $\frac{v - u}{t} = \frac{at}{t}$

So $a = (v-u)/t$

b) $v^2 = u^2 + 2as$ To rearrange for u :

Get u^2 on its own by subtracting $2as$ from both sides

$$v^2 - 2as = u^2 + 2as - 2as$$

$$v^2 - 2as = u^2$$

Now swap sides

$$u^2 = v^2 - 2as$$

Now square root

$$u = \sqrt{v^2 - 2as}$$

c) Internal energy = Total PE + $\frac{1}{2} mv^2$ To rearrange for m :

Get on its own by subtracting Total PE from both sides

$$\text{Internal energy} - \text{Total PE} = \frac{1}{2} mv^2$$

Now **divide** both sides v^2 and **multiply** both sides by 2

$$\frac{2 \times (\text{Internal energy} - \text{Total PE})}{v^2} = \frac{2 \times \frac{1}{2} mv^2}{v^2}$$

so $m = \frac{2 \times (\text{Internal energy} - \text{Total PE})}{v^2}$