



Using and rearranging a formula

Get the unknown on its own before you put the numbers in.



1 What is a formula?



A formula links several quantities using their symbols. You write it before you replace the symbols with numbers.

2 The rule: the inverse operation

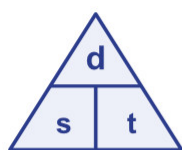
To get a quantity on its own, do the same operation to both sides of the equals sign. Choose the inverse of the operation that is in the way.

+	if a quantity is added	→	I subtract
-	if a quantity is subtracted	→	I add
×	if a quantity multiplies	→	I divide
÷	if a quantity divides	→	I multiply

3 The process, step by step

Goal	Starting formula	What is in the way	The inverse operation	New formula
Find d	$s = d / t$	d is divided by t	I multiply both sides by t	$d = s \times t$
Find V	$\rho = m / V$	V is on the bottom	I multiply by V, then divide by ρ	$V = m / \rho$
Find I	$P = U \times I$	I is multiplied by U	I divide both sides by U	$I = P / U$
Find t	$E = P \times t$	t is multiplied by P	I divide both sides by P	$t = E / P$
Find U_2	$U = U_1 + U_2$	U_2 is added to U_1	I subtract U_1 from both sides	$U_2 = U - U_1$

4 Memory trick: the triangle



Cover the quantity you want: what is left gives the formula.

I cover d $d = v \times t$

I cover v $v = d / t$

I cover t $t = d / v$

This trick only works for products and quotients. It does not replace the written method.

5 A complete calculation

Find the distance d, in m

You know

$$s = 5.0 \text{ m/s}$$

$$t = 12 \text{ s.}$$

Formula

$$t \times s = \frac{d}{t} \times t$$

So

$$d = s \times t$$

Substitution

$$d = 5.0 \times 12$$

Answer

$$d = 60 \text{ m}$$



Common mistake: moving a symbol across the equals sign without doing anything. Every step acts on both sides.



Check before handing it in

- ✓ I have written the starting formula
- ✓ I did the same operation to both sides
- ✓ The unknown is on its own

- ✓ I have identified the unknown
- ✓ The units are compatible
- ✓ The answer has its unit

