



# Rearranging formulae

Most formulae have one letter on its own on one side of the formula. This letter is called the SUBJECT of the formula.

$$e = mc^2 \quad e \text{ is the subject of the formula.}$$

CHANGING THE SUBJECT of a formula is like solving an equation. You have to do the same thing to both sides of the formula until you have the new letter on its own on one side.

$$e = mc^2 \quad (\div m)$$

$$\frac{e}{m} = c^2 \quad (\sqrt{\quad})$$

$$\sqrt{\frac{e}{m}} = c \quad c \text{ is now the subject of the formula.}$$

The inverse operation to  $x^2$  is  $\sqrt{\quad}$ . You need to square root EVERYTHING on both sides of the formula.

## Harder formulae

If the letter you need APPEARS TWICE in the formula you need to FACTORISE.

GROUP all the terms with that letter on one side of the formula and all the other terms on the other side.

FACTORISE so the letter only appears once.

DIVIDE by everything in the bracket to get the letter on its own.

For a reminder about factorising have a look at page 22.

## Worked example



$$N = \frac{3h + 20}{100}$$

Rearrange the formula to make  $h$  the subject.

$$N = \frac{3h + 20}{100} \quad (\times 100)$$

$$100N = 3h + 20 \quad (- 20)$$

$$100N - 20 = 3h \quad (\div 3)$$

$$\frac{100N - 20}{3} = h$$

$$h = \frac{100N - 20}{3}$$

It's a good idea to write your final answer as  $h = \dots$

## Worked example



Make  $Q$  the subject of the formula  $P = \frac{Q}{Q - 100}$ .

$$P = \frac{Q}{Q - 100} \quad [\times (Q - 100)]$$

$$P(Q - 100) = Q \quad (\text{multiply out brackets})$$

$$PQ - 100P = Q \quad (+ 100P)$$

$$PQ = Q + 100P \quad (- Q)$$

$$PQ - Q = 100P \quad (\text{factorise})$$

$$Q(P - 1) = 100P \quad [\div (P - 1)]$$

$$Q = \frac{100P}{P - 1}$$

Your final answer should look like  $Q = \dots$ . You need to factorise to get  $Q$  on its own.

## Now try this



1. Make  $s$  the subject of the formula  $v^2 = u^2 + 2as$  (2 marks)

2. Make  $x$  the subject of  $5(x - 3) = y(4 - 3x)$  (4 marks)

