

STUDY TIPS

A2.2 TRANSPOSITION: BRACKETS AND FRACTIONS

Examples

1. Transform the formula $P = 2(L - W)$ to make 'W' the subject.

$$P = 2(L - W)$$

$$\frac{P}{2} = L - W \quad [\div 2 \text{ both sides}]$$

$$\frac{P}{2} - L = -W \quad [-L \text{ both sides}]$$

$$W = -\frac{P}{2} + L \quad [\times (-1) \text{ both sides}]$$

2. If $\frac{2}{k} = \frac{j+1}{3}$ find 'k'.

$$\frac{2}{k} = \frac{j+1}{3}$$

$$k(j+1) = 6 \quad [\text{cross multiplying is useful for removing fractions}]$$

$$k = \frac{6}{j+1} \quad [\div (j+1)]$$

3. Rearrange the formula $L = \frac{Mt - g}{b}$ to make 'M' the subject.

$$L = \frac{Mt - g}{b} \quad [\text{the fraction bar acts as a bracket}]$$

$$L \times b = Mt - g$$

$$bL + g = Mt \quad [+g \text{ both sides}]$$

$$\frac{bL + g}{t} = M \quad [\div t \text{ both sides}]$$

$$M = \frac{bL + g}{t}$$

4. Make 'v' the subject of $E = mgh + \frac{1}{2}mv^2$.

$$E = mgh + \frac{1}{2}mv^2$$

$$E - mgh = \frac{1}{2}mv^2 \quad [-mgh \text{ both sides}]$$

$$2(E - mgh) = mv^2 \quad [\times 2 \text{ both sides}]$$

$$\frac{2}{m}(E - mgh) = v^2 \quad [\div m \text{ both sides}]$$

$$v = \pm \sqrt{\frac{2}{m} (E - mgh)} \quad [\sqrt{\text{both sides}}]$$

5. Transpose $T = 2\pi \sqrt[3]{\frac{L}{G}}$ to make 'L' the subject.

$$T = 2\pi \sqrt[3]{\frac{L}{G}}$$

$$\frac{T}{2\pi} = \sqrt[3]{\frac{L}{G}} \quad [\div 2\pi \text{ both sides}]$$

$$\left(\frac{T}{2\pi}\right)^3 = \frac{L}{G} \quad [\text{raise both sides to power 3}]$$

$$L = G \left(\frac{T}{2\pi}\right)^3 \quad [\times G \text{ both sides}]$$

Exercises

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|----------------------------|--------|------------------------------------|---------|
| 1. $S = C(A + B)$ | Find A | 2. $V = \frac{Ah}{3}$ | Find A. |
| 3. $A = \frac{h(a+b)}{2}$ | Find a | 4. $A = \frac{2B+C}{P}$ | Find B. |
| 5. $A = \frac{2P(B-C)}{3}$ | Find C | 6. $I = \frac{Mr^2}{2}$ | Find r |
| 7. $H = k(1 - bt)$ | Find b | 8. $t = 2\pi \sqrt{\frac{h+k}{g}}$ | Find h |
| 9. $v^2 = u^2 + 2as$ | Find u | 10. $m = \sqrt{\frac{x+y}{z}}$ | Find y |

Answers (NB: There may be equivalent forms of the correct answer)

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|----------------------------------|-------------------------|-----------------------------------|-------------------------------|----------------------------|
| 1. $A = \frac{S}{C} - B$ | 2. $A = \frac{3V}{h}$ | 3. $a = \frac{2A}{h} - b$ | 4. $B = \frac{AP-C}{2}$ | 5. $C = B - \frac{3A}{2P}$ |
| 6. $r = \pm \sqrt{\frac{2I}{M}}$ | 7. $b = \frac{k-H}{kt}$ | 8. $h = \frac{t^2 g}{4\pi^2} - k$ | 9. $u = \pm \sqrt{v^2 - 2as}$ | 10. $y = m^2z - x$ |