

Examples demonstrating the techniques involved

Ex1  $V = IR$  subject  $R$

$$R = \frac{V}{I}$$


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Ex2  $I = \frac{PRT}{100}$  subject  $T$

$$100I = PRT$$

$$T = \frac{100I}{PR}$$


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Ex3  $P = 2(L+B)$  subject  $L$

$$P = 2L + 2B$$

$$P - 2B = 2L$$

$$L = \frac{P - 2B}{2}$$


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Ex3 alternative solution

$$P = 2(L+B)$$

$$\frac{P}{2} = L + B$$

$$L = \frac{P}{2} - B$$


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Ex4  $V = \frac{1}{3}\pi r^2 h$  subject  $r$

$$3V = \pi r^2 h$$

$$\frac{3V}{\pi h} = r^2$$

$$r = \sqrt{\frac{3V}{\pi h}}$$


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Ex5  $a = 2\sqrt{b^2 - 2}$  subject  $b$

$$\frac{a}{2} = \sqrt{b^2 - 2}$$

$$\frac{a^2}{4} = b^2 - 2$$

$$\frac{a^2}{4} + 2 = b^2$$

$$b = \sqrt{\frac{a^2}{4} + 2}$$

or  $b = \sqrt{\frac{a^2 + 8}{4}}$

$$b = \frac{1}{2}\sqrt{a^2 + 8}$$


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Ex6  $v^2 = u^2 + 2as$  subject  $u$

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

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


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Ex7  $T = 2\pi\sqrt{\frac{L}{g}}$  subject L

$$\frac{T}{2\pi} = \sqrt{\frac{L}{g}}$$

$$\frac{T^2}{4\pi^2} = \frac{L}{g}$$

$$L = \frac{gT^2}{4\pi^2}$$


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Ex8  $y = \frac{5+x}{1-x}$  subject x

$$y(1-x) = 5+x$$

$$y - yx = 5+x$$

$$y - 5 = x + yx$$

$$y - 5 = x(1+y)$$

$$x = \frac{y-5}{y+1}$$


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Ex9  $f = \frac{uv}{u+v}$  subject u

$$f(u+v) = uv$$

$$fu + fv = uv$$

$$fv = uv - fu$$

$$fv = u(v-u)$$

$$u = \frac{fv}{v-u}$$


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Notes

1. Denominators

Multiply equations by denominators

2. Square Roots

Isolate square roots and then square both sides of equation

3. Brackets

Expand them to separate all the different terms

4. Powers of new subject

Isolate and then take appropriate root of both sides of eqn. eg

$$r^3 = 4pq$$

$$\Rightarrow r = \sqrt[3]{4pq}$$

5. Multiple occurrences of new subject

Take all terms involving subject to one side of the eqn, and all other terms to the other.

Factorise the side with the subject and divide by the factor you create to leave the subject on its own.

eg for subject x  $xp + xq = r$

$$x(p+q) = r$$

$$x = \frac{r}{p+q}$$


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