

Rearranging Harder Formulae

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- 1 A solid cone of radius r , height h and density ρ has mass M , where

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$$M = \frac{1}{3}\pi\rho r^2 h$$

Make r the subject of the formula.

- 2 (a) Make x the subject of $8x + y = 2x + 9$

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- (b) Make x the subject of $y(x - 3) = 3x + 8$

- 3 Make x the subject of $y = \frac{x-3}{x-5}$

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- 4 (a) Rearrange $y = \sqrt{5x - 14}$ to make x the subject.

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- (b) Rearrange $y = 2\sqrt{x} + 3$ to make x the subject.

- 5 (a) Rearrange $y = \frac{2}{x} + 1$ to make x the subject.

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- (b) Rearrange $y = \frac{17}{x-2}$ to make x the subject.

- 6 A car moving in a straight line starts at a speed of u metres per second and finishes at a speed of v metres per second. Its acceleration is a metres per second squared and it travels a distance of s metres.

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Those four are connected by the formula

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

- (a) Make u the subject of the formula.
(b) Work out u when $v = 11$, $a = 8$ and $s = 7$.

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- 7 The time period T of a pendulum of length l is given by

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$$T = 11\pi\sqrt{\frac{l}{g}}$$

Make g the subject of the formula.

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- 8 The volume, V , of a solid hemisphere of radius r is given by

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

Find a formula for r .

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- 9 (a) Rearrange $6x + y = 4x - 2$ to make x the subject.
(b) Rearrange $y(x + 1) = 4x - 5$ to make x the subject.

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10 Make x the subject of $y = \frac{3x+5}{x-8}$

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1	$r = \sqrt{\frac{3M}{\pi \rho h}}$	2	(a) $x = \frac{9-y}{6}$ (b) $x = \frac{8+3y}{y-3}$
3	$x = \frac{-3+5y}{y-1}$	4	(a) $x = \frac{y^2+14}{5}$ (b) $x = \frac{(y-3)^2}{4}$
5	(a) $x = \frac{2}{y-1}$ (b) $x = \frac{17}{y} + 2$	6	(a) $u = \sqrt{v^2 - 2as}$ (b) 3 m/s
7	$g = \frac{121\pi^2 l}{T^2}$	8	$r = \sqrt[3]{\frac{3V}{2\pi}}$
9	(a) $x = \frac{-2-y}{2}$ (b) $x = \frac{-5-y}{y-4}$	10	$x = \frac{5+8y}{y-3}$