

Solving a Formula for a Specified Variable

Ex: Formula for velocity $v = v_0 + at$ solve for a (a : acceleration; v_0 : initial velocity)

$$\frac{v - v_0}{t} = \frac{a t}{t}$$

$$\frac{v - v_0}{t} = a$$

$$a = \frac{v - v_0}{t}$$

Ex: Formula for the volume of a cone $V = \frac{1}{3}\pi r^2 h$ solve for h (r : radius of the base

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

h : height of the cone)

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

$$h = \frac{3V}{\pi r^2} \quad \text{same as } h = \frac{V}{\frac{1}{3}\pi r^2}$$

Ex: Formula for rate of travel (speed) $r = \frac{d}{t}$ solve for t (d : distance; t : time)

$$\cancel{\frac{r}{1}} \times \frac{d}{\cancel{t}}$$

$$rt = 1 \cdot d$$

$$\frac{rt}{r} = \frac{d}{r}$$

$$t = \frac{d}{r}$$

Ex: Formula for the forces on a beam $W = \frac{L(dL + 2P)}{8}$ solve for P

$$\cancel{\frac{W}{1}} \times \frac{L(dL + 2P)}{8}$$

$$8W = L(dL + 2P)$$

$$8W = L^2 d + 2LP$$

$$\frac{-L^2 d - L^2 d}{-L^2 d - L^2 d}$$

$$\frac{8W - L^2 d}{2L} = \frac{2LP}{2L}$$

$$\frac{8W - L^2 d}{2L} = P$$

$$P = \frac{8W - L^2 d}{2L}$$

alternative:

$$\frac{8W}{L} = \frac{L(dL + 2P)}{L}$$

$$\frac{8W}{L} = dL + 2P$$

$$\frac{-dL - dL}{-dL - dL}$$

$$\frac{\frac{8W}{L} - dL}{2} = \frac{2P}{2}$$

$$\frac{\frac{8W}{L} - dL}{2} = P$$

$$P = \frac{\frac{8W}{L} - dL}{2}$$