

SUBSTITUTION IN FORMULAE

Use the value of π on your calculator. Give your answer correct to one decimal place when needed.

1 If $P = 2(l + b)$, find the value of P when $l = 20$, $b = 12$.

$$P = 2(20 + 12) = 2 \times 32 = 64$$

3 If $F = ma$, find F when $m = 50$, $a = 0.2$.

$$F = 50 \times 0.2 = 10$$

4 If $F = \frac{9C}{5} + 32$, find: (a) F when $C = 60$ (b) C when $F = 41$.

$$a) F = \frac{9 \times 60}{5} + 32 = 140 \quad b) F - 32 = \frac{9C}{5} \quad \text{so } 9C = 5(F - 32)$$

$$C = \frac{5}{9}(F - 32) = \frac{5}{9}(41 - 32) = 5$$

5 If $A = \pi r^2$, find A when $r = 3.5$.

$$A = \pi \times (3.5)^2 = 38.5$$

9 If $s = ut + \frac{1}{2}at^2$, find: (a) s when $u = 5$, $a = 6$, $t = 2.4$ (b) a when $s = 50$, $t = 2.5$, $u = 10$.

$$a) s = 5 \times 2.4 + \frac{1}{2} \times 6 \times 2.4^2 \quad b) s - ut = \frac{1}{2}at^2 \quad \text{so } at^2 = 2(s - ut)$$

$$s = 29.3 \quad a = \frac{2}{t^2}(s - ut) = \frac{2}{2.5^2}(50 - 10 \times 2.5) = 8$$

13 If $r = \sqrt{\frac{A}{\pi}}$, find: (a) r when $A = 154$ (b) A when $r = 1.75$.

$$a) r = \sqrt{\frac{154}{\pi}} = 7.0 \quad b) r^2 = \frac{A}{\pi} \quad \text{so } A = \pi r^2$$

$$A = \pi \times 1.75^2 = 9.6$$

18 If $S = \frac{a(r^3 - 1)}{r - 1}$, find S when $a = 5$, $r = 3$.

$$S = \frac{5(3^3 - 1)}{3 - 1} = \frac{5 \times 26}{2} = 5 \times 13 = 65$$

22 If $P = \sqrt{\frac{2R - V}{5}}$, find: (a) P when $R = 50$, $V = 20$ (b) V when $P = 0.2$, $R = 20$.

$$a) P = \sqrt{\frac{2 \times 50 - 20}{5}} \quad b) P^2 = \frac{2R - V}{5} \quad \text{so } 2R - V = 5P^2 \text{ or } V = 2R - 5P^2$$

$$P = 4 \quad V = 2 \times 20 - 5 \times 0.2^2$$

$$V = 39.8$$