

PROPORTIONALITY

1) y is directly proportional to x , and $y = 8$ when $x = 5$.

- (a) Find a formula giving y in terms of x .
- (b) What is y when $x = 7$?
- (c) What is x when $y = 48$?

2) $P \propto Q^2$ and $P = 10$ when $Q = 2$.

- (a) Find a formula giving P in terms of Q .
- (b) What is P when $Q = 5$?
- (c) What is Q when $P = 90$?

3) The current I flowing through a circuit is directly proportional to the voltage V applied to the circuit. When the voltage is $12V$, the current is $0.2A$.

- (a) Find a formula giving I in terms of V .
- (b) What would the current be if $20V$ was applied to the circuit?
- (c) What voltage would be necessary to produce a current of $0.7A$?

4) The mass M of a circular disc is directly proportional to the square of its radius r . When $r = 6cm$, $M = 600g$.

- (a) Find a formula giving M in terms of r .
- (b) What is the mass of a disc of radius $3.5cm$?
- (c) What would be the radius of a disc with a mass of $2kg$?

5) The safe speed, V km/h, at which a car can round a bend of radius R metres varies directly as the square root of R . If the safe speed on a bend of radius $25m$ is $40km/h$,

- (a) Find a formula giving V in terms of R .
- (b) Find the safe speed around a bend of radius $15m$.
- (c) What is the minimum radius of bend allowable on a road designed to be safe at $110km/h$?

6) The volume V of water in a conical container is related to the height h by the formula $V \propto h^3$. When the water level is $10cm$, the volume is 0.8 litres.

- (a) Find a formula giving V in terms of h .
- (b) What is the volume of water when the water level is $16cm$?
- (c) What height of water is necessary for a volume of 2 litres ?