Tutorial 3 - Sheet 1

1. The area, A, and circumference, C, of a circle of radius r are given by the formulae

$$A = \pi r^2, \qquad C = 2\pi r$$

Find the area and circumference of the circle with radii a) 4cm., b) 15m.

2. When a force, F, is applied to an object, the object may move. The work done, W, by the force is equal to the product of the force and the distance moved in the direction of the force. Let this distance be d.

(a) Write down a formula relating W, F, and d.
(b) Evaluate the work done when F=10 and d=17.

3. Transpose the formula $F = \dfrac{kQ_1Q_2}{r^2}$

(a) to make Q_1 the subject, (b) to make k the subject.

4. Transpose the following formulae to make the given variable the subject:

(a) $V = \pi r^2 h$ *for* h (b) $P = 4Q^2R$ *for* R

(c) $x - 3xy = 4$ *for* y (d) $\dfrac{a}{x} + bx = \dfrac{c}{x}$ *for* x

5. From an experiment it is known that the variable F is proportional to the variable y.

(a) Write down a formula connecting F and y.
(b) It is known that when y=10, the value of F is 50. Find the constant of proportionality.
(c) Find the value of F when y=100.

6. It is known from an experiment that a variable V is inversely proportional to the square of the variable s.

(a) Write down a formula connecting V and s.
(b) When s=2 the value of V is 13. Find the constant of proportionality.
(c) Find the value of V when s=100.

7. A quantity ϕ is directly proportional to x and inversely proportional to $\sqrt{y}$

(a) State a formula connecting ϕ, x and y.
(b) When y=9, and x=3, the value of ϕ is 7. Find the constant of proportionality.
(c) Calculate ϕ when y=100 and x=8.