Substituting into complex formulae

(1) Find the value of these expressions when a = 4

a) $3a^2 + 4$ b) $2a^3$ c) $\frac{32}{a^2}$ d) $a^3 + 3a$

(2) Find the value of y when x = -3

a) $y = \frac{2x+3}{x}$ b) $y = \frac{x+7}{x+4}$ c) $y = \frac{x-1}{x+1}$

(3) If p = 10, calculate the value of $\frac{2p^2(p-3))}{7p}$

(4) The volume (V cm^3) of a sphere is given by the formula $V = \frac{\pi d^3}{6}$

a) Calculate V when the diameter (d) of the sphere is 2.5 cm
b) Calculate V when the diameter (d) of the sphere is 9.1 cm

(5) The volume of a torus (doughnut) is given by the formula:

$$V = 0.25\pi^2(a+b)(a-b)^2$$

Calculate the volume when a =4.5cm and b = 7.5 cm

(6) A cuboid has length (l), width (w) and height (h). It's surface area is given by the formula:

$$S = 2lw + 2wh + 2lh$$

(a) Calculate the surface areas when h =3cm, l =10cm and w= 4cm
(b) Calculate the length (l) when S = 410, l =10 and w = 5

(7) If s = 1.7 and t = 0.9, calculate the value of P and A where:

$$P = s + t + \frac{5\sqrt{(s^2+t^2)}}{3} \qquad A = \frac{1}{2}st + \frac{(s^2+t^2)}{9}$$

(8) An early Greek formula for the area of a triangle with sides a, b and c is:

$A = \sqrt{s(s-a)(s-b)(s-c)}$ where s = $\frac{1}{2}(a+b+c)$

Calculate the area when a= 4cm, b = 9cm, c = 11cm