**12K Differentiation in Context**

1. Given that the volume, $V cm^{3}$, of an expanding sphere is related to its radius, $r cm$, by the formula $V=\frac{4}{3}πr^{3}$, find the rate of change of volume with respect to radius at the instant when the radius is 5cm.
2. A large tank (shown) is to be made from 54m2 of sheet metal. It has no top.

a) Show that the Volume of the tank will be given by:

$$V=18x-\frac{2}{3}x^{3}$$

b) Find the Maximum volume of the tank