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 $V = \frac{4}{3}\pi r^3$, 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 54m^2 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