

Answer on Question #50589 - Math - Calculus

Question The radius, r cm, of a circle at time t seconds is given by $r = 2t^2 + 1$. Express its area, A cm², in terms of t and find the rate of change of the area at the instant when $t=2$. (Leave your answer in terms of π)

Solution Area A is

$$A = \pi r^2 = \pi(2t^2 + 1)^2 = \pi(4t^4 + 4t^2 + 1)$$

The rate of change is

$$\frac{dA}{dt} = \pi(16t^3 + 8t)$$

At time $t=2$ it will be

$$\frac{dA}{dt}(2) = \pi(16 \cdot 8 + 8 \cdot 2) = 144\pi$$