MCS21 Homework 26

1. A point is moving along the graph of the given function such that $\dfrac{dx}{dt}$ is 2 centimeters per second.

    Find $\dfrac{dy}{dt}$ for the given value of x:

    a) $y = x^2 + 1$ $x = -1$ b) $y = \dfrac{1}{1 + x^2}$ $x = 2$

2. Suppose x and y are both differentiable functions of t and are related by the equation $y = x^2 + 3$.
    Find $\dfrac{dy}{dt}$ when $x = 1$ given that $\dfrac{dx}{dt} = 2$.

3. If $x^2 + 3xy + y^2 = 1$ and $\dfrac{dy}{dt} = 2$, find $\dfrac{dx}{dt}$ when $y = 1$.

4. If $V = \frac{4}{3}\pi r^3$, find $\dfrac{dV}{dt}$ when $r = 3$, given that $\dfrac{dr}{dt} = 1$.