Solve the problem.

1) A ladder is slipping down a vertical wall. If the ladder is 10 ft long and the top of it is slipping at the constant rate of 3 ft/s, how fast is the bottom of the ladder moving along the ground when the bottom is 8 ft from the wall?

2) A container is the shape of an inverted right circular cone has a radius of 5 inches at the top and a height of 6.00 inches. At the instant when the water in the container is 2 inches deep, the surface level is falling at the rate of -.400 in./s. Find the rate at which water is being drained.

Find an equation for the line tangent to the curve at the point defined by the given value of t.

3) $x = 6 \sin t$, $y = 6 \cos t$, $t = \frac{\pi}{4}$

Solve the problem.

4) Find the points at which the tangent to the curve $x = 6 - t^2$, $y = t^3 - 5t$ is vertical and horizontal.

For the equation below, do each of the following.

5) $2y^2 + 7x^2 - 13 = 0$

a) Find dy/dx by implicit differentiation.

b) Determine the equation of the tangent line when $x = 1$.

c) Find the points on the curve where the lines tangent to the curve are vertical.

d) Find $\frac{d^2y}{dx^2}$ in terms of x and y.