

Review over Implicit Differentiation and Particle Motion

1. Consider the curve defined by $x^3 - 3x^2y + 2xy^2 = 24$

a. Find $\frac{dy}{dx}$ (derivative)

b. Write an equation for the line tangent to the curve at the point (2,-1)

2. Consider the curve defined by the equation: $\tan(x + y) = 1$

a. Find $\frac{dy}{dx}$

b. Find $\frac{d^2y}{dx^2}$ (second derivative)

3. If $x^2 + y^2 = 8$, find an expression for y'' .

4. If $x^2 - xy + y^3 = 1$, find an expression for y' .

5. Use implicit differentiation to find y'' if $2xy = y^2$.

6. A particle moves along a straight line with equation of motion $s = t^3 - t^2$. Find the value of t at which the acceleration is equal to zero.

7. A particle moves according to a law of motion $s = t^3 - 6t^2 + 9t + 11$.

a. What is the velocity of the particle at $t=0$.

b. During what intervals is the particle moving left?

c. What is the total distance travelled by the particle from $t=0$ to $t=2$.

d. Determine the displacement of the particle from $t=0$ to $t=2$.

8. A dynamite blast blows a heavy rock straight up with a launch velocity of 160 ft/sec. It reaches a height of $s = 160t - 16t^2$.

a. How high does the rock go?

b. How fast is the rock going when it is 256 ft above the ground?