

Related Rates

1. use the given values to find dy/dt and dx/dt .
(similar to p.156 #2)

$$y = 10(x^2 - 5x + 2)$$

$$(a) \frac{dy}{dt} \quad x = 5, \frac{dx}{dt} = 4$$

$$(b) \frac{dx}{dt} \quad x = 2, \frac{dy}{dt} = 7$$

2. use the given values to find dy/dt and dx/dt .
(similar to p.156 #4)

$$x^3 + y^3 = 9$$

$$(a) \frac{dy}{dt} \quad x = 1, y = 2, \frac{dx}{dt} = 5$$

$$(b) \frac{dx}{dt} \quad x = 2, y = 1, \frac{dy}{dt} = 3$$

3. A company that manufactures pet toys calculates that its costs and revenue can be modeled by the equations:

$$C = 50,000 + 3.1x \quad \text{and} \quad R = 300x - 0.2x^2$$

where x is the number of toys produced in 1 week. If production in one particular week is 2000 toys and is increasing at a rate of 300 toys per week, find:

- (a) the rate at which the cost is changing
- (b) the rate at which the revenue is changing
- (c) the rate at which the profit is changing

(similar to p.156 #12)

4. The profit for a product is increasing at a rate of \$6000 per week. The demand and cost functions for the product are given by $p = 5000 - 30x$ and $C = 3000x + 6000$. Find the rate of change of sales with respect to time when the weekly sales are $x = 50$ units

(similar to p.157 #25)