Related Rates

In problems 1-2, Assume that x and y are both differentiable functions of t. Use the given values to find (a) dy/dt and (b) dx/dt.

1.

Equation	*Find*	*Given*
$y = \sqrt[3]{x}$	$(a)\ \frac{dy}{dt}$ when $x = 8$	$\frac{dx}{dt} = 5$
	$(b)\ \frac{dx}{dt}$ when $x = 27$	$\frac{dy}{dt} = 3$

2.

Equation	*Find*	*Given*
$x^2 y = 3$	$(a)\ \frac{dy}{dt}$ when $x = 1$	$\frac{dx}{dt} = -2$
	$(b)\ \frac{dx}{dt}$ when $x = 3$	$\frac{dy}{dt} = 4$

3. Given the cost function is $C(x) = 0.50x + 200000$ and the revenue function is $R(x) = 300x - 2x^2$ where x is the number of units built in one month. Given that 500 units are built in one month and increased at a rate of 20 units per month. Find the rates at which the (a) cost, (b) revenue, and (c) profit are changing.

4. Given the demand function is $p(x) = 1000 - 10x$ and the cost function is $C(x) = 3200x + 6000$. If the profit is increasing at a rate of $4000 per week. Find the rate of change of sales with respect to time when the weekly sales are x = 50 units.