

Directions: Work all problems in the assignment. If you need more room use the back of the page to complete the problem.

**Section 2.7**

Problem 6. Find  $dy/dx$ .

$$xy^2 + 4xy = 10$$

Problem 12. Find  $dy/dx$ .

$$\frac{2x + y}{x - 5y} = 1$$

Problem 24. Find  $dy/dx$  and evaluate the derivative at the given point.

$$(x + y)^3 = x^3 + y^3 \quad (-1, 1)$$

Problem 38. Find equations of tangent lines to the graph of the solution set of the equation given below at the given points.

$$4xy + x^2 = 5 \quad (1, 1) \text{ and } (5, -1)$$

Problem 44. **Demand:** Compute the rate of change of  $x$  (the demand) with respect to  $p$  (the price).

$$p = \sqrt{\frac{500 - x}{2x}}$$

for  $0 < x \leq 500$ .

## Section 2.8

Problem 12. **Cost, Revenue, and Profit** A company that manufactures pet toys calculates that its costs and revenue can be modeled by the equations

$$C = 75,000 + 1.05x \quad R = 500x - \frac{x^2}{25}$$

where  $x$  is the number of toys produced in 1 week. If production in one particular week is 5000 toys and is increasing at a rate of 250 units per week, find:

- (a) the rate at which the cost is changing,
- (b) the rate at which the revenue is changing, and
- (x) the rate at which the profit is changing.

Problem 14. **Expanding Cube** All edges of a cube are expanding at a rate of 3 centimeters per second. How fast is the surface area changing when each edge is (a) 1 centimeter and (b) 10 centimeters?

Problem 22. **Advertising Costs** A retail sporting goods store estimates that weekly sales  $S$  and weekly advertising costs  $x$  are related by the equation  $S = 2250 + 50x + 0.35x^2$ . The current weekly advertising costs are \$1500 and these costs are increasing at a rate of \$125 per week. Find the current rate of change of weekly sales.

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