

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

**Section 6.6**

Problem 8. Determine whether or not the improper integral converges. If it does, evaluate the integral.

$$\int_{1/2}^{\infty} \frac{1}{\sqrt{2x-1}} dx$$

Problem 40. **Present Value** A farm is expected to yield a profit at the rate of \$75,000 per year. Assume that money will earn interest at the nominal rate of 8% compounded continuously. What is the present value of the farm (a) for 20 years and (b) forever?

### Section 7.3

Problem 6. For the function

$$f(x, y, z) = \sqrt{x + y + z}$$

find the function values  $f(0, 5, 4)$  and  $f(6, 8, -3)$ .

Problem 46. **Consumer Awareness** The average amount of time that a customer waits in line for service is given by

$$W(x, y) = \frac{1}{x - y} \quad y < x$$

where  $y$  is the average arrival rate and  $x$  is the average service rate ( $x$  and  $y$  are measured in the number of customers per hour). Evaluate  $W$  at (a)  $(15, 10)$ , (b)  $(12, 9)$ , (c)  $(12, 6)$ , and (d)  $(4, 2)$ .

## Section 7.4

Problem 22. Evaluate  $f_x$  and  $f_y$  at the point.

$$f(x, y) = x^2 - 3xy + y^2 \quad (1, -1)$$

Problem 30. Find the first partial derivatives of the function

$$w = \sqrt{x^2 + y^2 + z^2}$$

Problem 34. For the function

$$w = \frac{xy}{x + y + z}$$

find  $w_x$ ,  $w_y$ , and  $w_z$  at the point  $(1, 2, 0)$ .

Problem 60. Find the second partial derivatives of

$$z = \frac{x}{x + y}$$

Problem 70. **Marginal Productivity** Let  $x = 1000$  and  $y = 500$  in the Cobb-Douglas productivity function given by

$$f(x, y) = 100x^{0.75}y^{0.25}$$

- (a) Find the marginal productivity of labor  $\partial f/\partial x$ .
- (b) Find the marginal productivity of capital  $\partial f/\partial y$ .

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