
This assignment is due by 4:00 pm on May 4, 2009 You can turn it in to me in class or drop it by the office, **Blocker 640D**. Be sure that you follow the homework rules, they can be found on your syllabus. Please work the problems in the order that they are listed.

LAST HOMEWORK ASSIGNMENT.

1. Use these functions to compute the following:

$$f(x, y) = 3x^2 + 4xy^3 + 7$$

$$g(y, x) = x^4 + 2y^2 + xy$$

$$h(z, x, y) = 3x^2y - z^2 + 3yz$$

(a) $f(3, 5)$

(b) $5f(7, 2) + g(2, 4)$

(c) $h(-2, 4, 5) + 3g(1, 5) - 5f(6, 8)$

2. The Cobb-Douglas production function for a petroleum company is given by $f(x, y) = 15x^{0.4}y^{0.6}$ where x is the utilization of labor and y is the utilization of capital.

(a) If the company uses 1780 units of capital and 1350 units of labor, how many units of petroleum will be produced?

(b) The company wants to produce 28,000 units of petroleum. If the company is willing to use 1600 units of capital, how many units of labor are needed?

3. Find the first partials f_x and f_y of

(a) $f(x, y) = \ln(6x^2 + 2xy^2 - 3y)$

(b) $f(x, y) = (3x^3 - 5xy^4 + 9y^2)^5(3y^4 + e^2y)$

4. Find the first, f_x and f_y , and second partials, f_{xx} , f_{xy} , f_{yy} , and f_{yx} , of

(a) $f(x, y) = 6x^3 + 8x^2y - 4xy^3 + 8y^{10} + 9$

(b) $f(x, y) = e^{(3x^4 + 10xy^2 + 2y^3)}$

5. The productivity of a business is approximated by $f(x, y) = 12x^{0.25}y^{0.75}$ with the utilization of x units of labor and y units of capital.

(a) If the business is now using 350 units of labor and 500 units of capital, find the marginal productivity of labor.

(b) If the business is now using 350 units of labor and 500 units of capital, find the marginal productivity of capital.

(c) The business can either increase labor or capital by one unit. Which should be chosen to have the greatest effect on the production for the business?

6. Classify the critical values when $f(x, y) = x^2 + y^4 - 6x - 8y^2$

7. Classify the critical values when $f(x, y) = x^3 + 6xy - 2y^2$