

Math 111 - Assignment 2

Due 02/01/07

Please complete the following problems and hand in your solutions in class on Thursday February 1 (late assignments will not be accepted). In addition please write your name and student number on the front page of your work, as well as on the back of the final page of your work, and staple all pages together.

1. Calculate the partial derivatives, f_x and f_y of the function

$$f(x, y) = \frac{e^{x^2+y}}{\ln(x^3y^5)}.$$

2. The production function of a certain country is given by

$$f(x, y) = 10x^{1/3}y^{2/3},$$

when x units of labor and y units of capital are used.

- a) What is the marginal productivity of labor (f_x) and the marginal productivity of capital (f_y) when the amounts expended on labor and capital are 64 units and 125 units respectively?
- b) Should the government increase expenditures on labor or capital in order to increase production the most?

3. Suppose that the monthly demand function for Product A is given by

$$f(p, q) = \frac{4}{(1+p^2)q^4}$$

and the monthly demand for Product B is given by

$$g(p, q) = \frac{1}{(4+q^2)\sqrt{p}}.$$

Determine whether these commodities are substitute, complementary, or neither.