

Mathematics for Business I

1st G.A.D.E., Academic Year 2011/12

Control Unit 3 (Option B)

SURNAME(S): NAME:

You must write your answers in this sheet. They must be just the final answers, you mustn't write your calculations on this sheet. Use the other sheet for you calculations; you must give the lecturer that sheet also, although it won't be taken into account.

1. Let $Q(x, y) = (x - 1/4)^{1/2}(y - 1/4)^{1/2}$ a production function measuring the quantity produced of a good depending on the quantities x and y of two inputs A and B.

a) **(0.1 points)** Calculate both marginal productivities at any point (x, y) .

b) **(0.15 points)** At present, $x = 3/4$ and $y = 3/4$. If you want to increase the production and you can only increase one of the inputs, which one would you suggest to increase its quantity and why?

- c) **(0.15 points)** At present, $x = 3/4$ and $y = 3/4$. How would the production vary if we decrease the quantity of A in $1/10$ and we decrease the quantity of B in $1/8$?
- d) **(0.15 points)** At present, $x = 3/4$ and $y = 3/4$. Calculate how should the quantity of B change if we want to decrease the quantity of A in $1/4$ units, keeping the production at the same level.
- e) **(0.15 points)** At present, $x = 3/4$ and $y = 3/4$. Calculate how an increase of 1 % in the quantity of B would affect the production.
- f) **(0.1 points)** Is Q is an homogeneous function? If so, say what kind of returns (increasing, decreasing or constant) has Q , and explain what it means.
- g) **(0.1 points)** Calculate and represent graphically the domain of Q .
- h) **(0.1 points)** Calculate and represent graphically the isoquant of level 1. Calculate one point on that isoquant.