# Mathematics for Business I 

$1^{\text {st }}$ G.A.D.E., Academic Year 2011/12

## Control Unit 3 (Option A)

SURNAME(S): NAME: $\qquad$

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 $Q(x, y)=(x-1 / 2)^{1 / 2}(y-1 / 2)^{1 / 2}$ 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) Is $Q$ is an homogeneous function? If so, say what kind of returns (increasing, decreasing or constant) has $Q$, and explain what it means.
b) ( 0.1 points) Calculate and represent graphically the domain of $Q$.
c) ( 0.1 points) Calculate and represent graphically the isoquant of level 1. Calculate one point on that isoquant.
d) ( 0.1 points) Calculate both marginal productivities at any point $(x, y)$.
e) ( 0.15 points) At present, $x=3 / 2$ and $y=3 / 2$. 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?
f) ( 0.15 points) At present, $x=3 / 2$ and $y=3 / 2$. Calculate how an increase of $1 \%$ in the quantity of B would affect the production.
g) ( 0.15 points) At present, $x=3 / 2$ and $y=3 / 2$. Calculate how should the quantity of $B$ change if we want to decrease the quantity of A in $1 / 2$ units, keeping the production at the same level.
h) ( 0.15 points) At present, $x=3 / 2$ and $y=3 / 2$. How would the production vary if we decrease the quantity of A in $1 / 8$ but we increase the quantity of B in $1 / 10$ ?
