

Intermediate Microeconomics - Spring 2016

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Maths Refresher Questions

Due For Practice Only

Question 1 Take the first and second derivatives of the following functions

1. $f(x) = a + bx + cx^2$
2. $f(x) = \ln(x) + x^{\frac{1}{2}}$
3. $f(x) = 2^x$ (hint: use the fact that, for any y , $y = \exp(\ln(y))$)

Question 2 Take the partial derivatives of the following functions

1. $f(x, y) = xy(x^2 + y^2)$
2. $f(x, y) = x \ln(y)$

Question 3 Find $\frac{dy}{dx}$ for the function $x^2y - xy^2 + x = 0$

Question 4 Use the chain rule to do the following

1. Write an expression for $\frac{dw}{dx}$ when $w = g(y)$ and $y = h(x)$
2. Using this result calculate $\frac{dw}{dx}$ when $w = (150 - y^2)$ and $y = \ln(x)$
3. Write an expression for $\frac{dz}{dt}$ when $z = f(x(t), y(t))$
4. Using this result, calculate $\frac{dz}{dt}$ when $z = (x^2 + y^2)$, $x = e^{-t}$ and $y = e^t$

Question 5 Draw a graph of the function $f(x) = (x - 2)(3x + 7)(x - 9)$ (hint: first solve for all the places at which $x = 0$. This tells you where the function crosses the line. Then solve for all the places at which $\frac{df}{dx} = 0$. This will tell you where the function is flat. Finally, use the second order conditions to determine whether these points are maxima or minima)

Question 6 For each of the following functions solve for x as a function of y

1. $y = \frac{e^x}{2}$

2. $\ln(x) = \ln(3) + \ln(y)$

3. $\ln(x) = 3y$