Name and surname:

U number:

Calculus I - MAC 2311 - Section 007

Quiz 4

10/19/2017

Logarithmic differentiation

You want to differentiate the function $f(x)$ by using logarithmic differentiation:

♦ **Step 0:** *Set* $y = f(x)$.

♦ **Step 1:** *Take the natural logarithm both sides in the equation* $y = f(x)$ *and use the Laws of Logarithms to simplify your right-hand expression.*

♦ **Step 2:** *Differentiate both sides implicitly with respect to* x.

♦ **Step 3:** *Solve your resulting equation for* $\dfrac{dy}{dx}$ *and, at the end, do not forget that* $y = f(x)$...

1) [5 points] Use logarithmic differentiation to compute the derivative of the following function:

$$f(x) = \frac{\cos^3(x)}{e^{2x} \cdot (x^4 - 2x^2 + 5x)^7}.$$

2) [5 points] Compute the derivative of the following function:

$$f(x) = x^{\sin(2x)}.$$

3) [Bonus] Use logarithmic differentiation to prove the **power rule**.