MATH 1271 SECTION 30 RECITATION QUIZ 6

Grader: Cihan Bahran

Name: SOLUTIONS

Time limit: 20 minutes

TA: _____

NO CALCULATORS. NO HANDHELD DEVICES. NO BOOKS OR REFERENCE MATERIALS OF ANY KIND.

1. (35 points) Find the equation of the tangent line to the graph of the equation

$$x^2y^3 + e^{2xy} = \frac{x}{y} + y^5$$

at the point $(0, 1)$.

$$2xy^3 + x^2(3y^2y') + e^{2xy}(2x + 2y') = \frac{y - xy'}{y^2} + 5y^4y'$$

$$0 + 0 + 1(0 + 2m) = \frac{1 - 0}{1} + 5m$$

$$2m = 1 + 5m$$

$$-3m = 1$$

$$m = -1/3$$

$$y - 1 = (-1/3)(x - 0)$$

OR $y = 1 - \frac{x}{3}$

2. (20 points) Let $f : \mathbb{R} \to \mathbb{R}$ be a differentiable and invertible function with the inverse $g : \mathbb{R} \to \mathbb{R}$. If $f(3) = 5$ and $f'(3) = \frac{2}{3}$, then what is $g'(5)$?

$$g'(5) = \frac{1}{f'(g(5))} = \frac{1}{f'(3)} = \frac{1}{2/3}$$

A) $\frac{1}{3}$

B) $\frac{2}{3}$

C) $\frac{3}{2}$

D) 3

E) Can't be determined with the given information.

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3. (35 points) Find the derivative of the function

$$f(x) = \arctan\left(\frac{e^{5x}}{\sqrt{1+x^2}}\right).$$

You don't need to simplify the expression you get after differentiating.

$$f'(x) = \left[\frac{1}{1+\left(\frac{e^{5x}}{\sqrt{1+x^2}}\right)^2}\right]\left[\frac{\left(\sqrt{1+x^2}\right)\left(5e^{5x}\right) - \left(e^{5x}\right)\left(\frac{2x}{2\sqrt{1+x^2}}\right)}{1+x^2}\right]$$

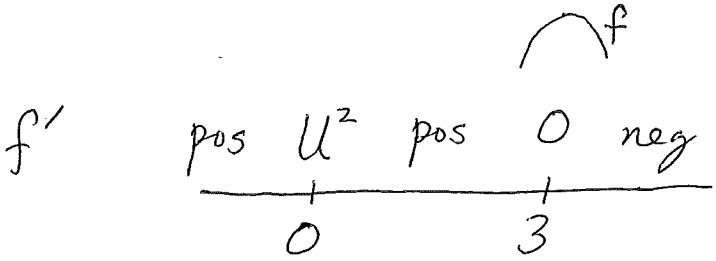
4. (10 points) Suppose $f : \mathbb{R} \to \mathbb{R}$ is a differentiable function whose **derivative** is

$$f'(x) = \frac{6-2x}{x^2}.$$

Is the following statement true or false?

$x = 3$ is a local minimum of f.

True (False)



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