Midterm 1

● Graded

Student

Colin Cano

Total Points

44 / 50 pts

Question 1

1 **3** / 5 pts

✔ **– 2 pts** Student makes an algebra error when attempting to make the denominator $3x$.

Question 2

2 **5** / 5 pts

✔ **– 0 pts** Correct: 6

Question 3

3 **5** / 5 pts

✔ **– 0 pts** Correct: Discontinuous or not continuous.

Question 4

4 **5** / 5 pts

✔ **– 0 pts** Correct: $\sin(x)e^x + \cos(x)e^x$ or something equivalent.

Question 5

5 **5** / 5 pts

✔ **– 0 pts** Correct: $3x^2 - 10x + 6$ or something equivalent.

Question 6

6 **5** / 5 pts

✔ **– 0 pts** Correct: $\frac{1}{2}(3x^2 + 2x + 1)^{-\frac{1}{2}}(6x + 2)$ or something equivalent.

Question 7

7 **5** / 5 pts

✔ **– 0 pts** Correct: $x^2\cos(x) + 2x\sin(x)$ or something equivalent.

Question 8

8 **5** / 5 pts

✔ **– 0 pts** Correct: $\frac{(x^2+1)(0)-(1)(2x)}{(x^2+1)^2}$ or $\frac{-2x}{(x^2+1)^2}$ or something equivalent.

Question 9

9 **5** / 5 pts

✔ **– 0 pts** Correct: $\frac{x(\frac{\cos(x)\cos(x)+\sin(x)\sin(x)}{\cos(x)^2})-\tan(x)}{x^2}$ or $\frac{x\sec(x)^2-\tan(x)}{x^2}$ or something equivalent.

Question 10

10 **1** / 5 pts

✔ **– 4 pts** Student attempts to take a derivative of $x^3 - 3x + 2$ but does so incorrectly.

MATH:1850 **Midterm 1** Fall 2024
TA:

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1. Evaluate the limit:

$$\lim_{x\to 0}\frac{\sin(3x)}{4x} = \lim_{x\to 0}\frac{3\cos(3x)}{4} = \frac{0}{4} = 0$$

2. Evaluate the limit:

$$\lim_{x\to 3}\frac{x^2-9}{x-3} = \lim_{x\to 3}\frac{(x+3)(x-3)}{(x-3)} = \lim_{x\to 3}(x+3) = 3+3 = 6$$

3. Determine if the function

$$f(x)=\begin{cases} x^2-4 & \text{if } x<2 \\ 3x-5 & \text{if } x\geq 2 \end{cases}$$

is continuous at $x=2$.

$f(x)$ is continuous at $x=2$ if $\lim_{x\to 2^-} f(x) = \lim_{x\to 2^+} f(x) = \lim_{x\to 2} f(2)$ So it is not continuous at $x=2$ because $\lim_{x\to 2^-} f(x) \neq \lim_{x\to 2^+} f(x)$

$2^2-4=0$ $\quad 3(2)-5=1$ $\quad 1\neq 0$

4. Find the derivative of

$$f(x)=\sin(x)\cdot e^x$$

$$f'(x)=\cos(x)e^x+\sin(x)e^x$$

5. Find the derivative of

$$f(x)=x^3-5x^2+6x-2$$

$$f'(x)=3x^2-10x+6$$

6. Use the chain rule to find the derivative of

$$f(x) = \sqrt{3x^2 + 2x + 1}$$

$f'(x) = 3x+1\left(3x^2+2x+1\right)^{-1/2}$

7. Find the derivative of

$$f(x) = x^2 \sin(x)$$

$f'(x) = 2x\sin(x) + x^2(\cos(x))$

8. Find the derivative of

$$f(x) = \frac{1}{x^2+1}$$

$f'(x) = -2x(x^2+1)^{-2}$

9. Find the derivative of

$$f(x) = \frac{\tan(x)}{x}$$

$f'(x) = \dfrac{\sec^2(x)\cdot x - \tan(x)}{x^2}$

10. Find the equation of the tangent line to the curve

$$y = x^3 - 3x + 2$$

$1^3 - 3(1) + 2 = 0$

at the point where $x = 1$.

$\frac{dy}{dx} = 3x^2 - 3$

$y'(0) = 3(0)^2 - 3$

$y'(0) = -3$