Quiz #1 101 Math 011

Name: ____________________________  I.D. ____________________________

1. Find the limit \( \lim_{x \to 3} \frac{x}{x - 3} \)

2. Find \( N \) when \( \lim_{x \to \infty} \frac{x}{x + 1} = 1 \) and \( \varepsilon = 0.001 \)

Quiz #2 101 Math 011

Name: ____________________________  I.D. ____________________________

3. Find by definition the derivative of the function \( f(x) = x^4 \)

4. Find \( f(x) \) and \( a \) if \( f'(a) = \lim_{h \to 0} \frac{\cos(\pi + h) + 1}{h} \)

5. Find the coordinate of all points on the graph of \( y = 1 - x^2 \) at which the tangent line passes through the point \((2,0)\)

Quiz #3 101 Math 011

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4. (Q15/3.6) Find the local linear approximation of \( f(x) = \sqrt{x + 1} \) at \( x_0 = 0 \) and use it to approximate \( \sqrt{1.1} \).

5. (Q28/4.1) Find the formula for \( f(x)^{-1} \) and state the domain of \( f(x)^{-1} \) where \( f(x) = 3x^2 + 5x - 2 \), \( x \geq 0 \).

Quiz #4 101 Math 011

Name: ____________________________  I.D. ____________________________

5. Q27/5.3 Consider the function \( f(x) = 2x + 3x^\frac{1}{2} \) Follow the steps to sketch the Graph of the function.

1) Find symmetry if any

2) Find y-int. then x-int. then check if the graph above the x-axis or below.
3) Find relative extreme then check if the graph increasing or decreasing

\[ f' \] 

4) Find asymptotes if any

5) Find inflection points if any then check if the graph concave up or down

\[ f'' \]

6) Check the behavior of the graph as \( x \to \infty \) and \( x \to -\infty \)

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**Quiz #6 101 Math 011**

**Q32/6.1** Find absolute min. and max. for the function \( f(x) = \frac{\ln x}{x} \) in the interval \([1, 2\ e]\)

**Q34/6.2** A cone is made from a circular sheet of radius \( R \) by cutting out a sector and gluing the cut edges of the remaining piece together. What is the maximum volume attainable for the cone.

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**Quiz #7 101 Math 013**

1. Find the absolute extrema for the function \( f(x) = 2x^3 - 3x^2 - 12x + 1 \) in \([-2, 3]\)
2. Let \( f(x) = |2 - x| \) show that there is no \( c \) such that \( \frac{f(3) - f(1)}{3 - 1} = f'(c) \), explain why this does not contradict the Mean Value Th.

3. A closed rectangular box with a square base is to have a volume 20,000 \( cm^3 \). The material for the bottom of the box will cost 8 S. R. per \( cm^2 \), and the material for the sides and the top of the box will cost 2 S. R. per \( cm^2 \). Find the dimensions that will minimize the cost of the material.

4. A rock thrown downward with an unknown initial velocity from a height of 1000 ft reaches the ground in 4s, find the velocity of the rock when it hits the ground.