CALCULUS II MIDTERM EXAM 2 AUGUST 27, 2026

Please show **all** your work! Answers without supporting work will not be given credit. Write your final answers in the spaces provided. You have 75 minutes to complete this exam.

Name:_____

1. Evaluate the following limits. If a limit does not exist, say so.

   (a) $\lim_{x \to 0} \dfrac{1 - \cos(x)}{x^2}$

   Answer:_____

   (b) $\lim_{x \to \infty} \dfrac{3x^2 - x}{x^2 + 5}$

   Answer:_____

2. Use the definition of the derivative as a limit to find $f'(x)$ for $f(x) = x^2 + 3x$.

3. Find the derivative of each function. Simplify your answer as much as possible. Show all your work.

   (a) $f(x) = x^3 \ln(x)$

$f'(x) =$_____

   (b) $g(x) = \dfrac{\sin(x)}{1 + \cos(x)}$

$g'(x) =$_____

4. Find the equation of the tangent line to the curve $y = \sqrt{x + 3}$ at the point where $x = 1$.

Answer:_____

5. Set up, but do **not** evaluate, the integral for the area between the curves $y = x^2$ and $y = 2x - x^2$.

The End.