MATH:1850 **Practice Exam 1** Fall 2024
TA:

Name: _____ **Student ID**: _____

1. Evaluate the limit: $\lim_{x \to 0} \dfrac{\sin(4x)}{2x}$

2. Evaluate the limit: $\lim_{x \to 0} \dfrac{\cos(4x) - 1}{2x}$

3. Evaluate the limit: $\lim_{x \to 7} \dfrac{x^2 - 4x - 21}{x - 7}$

4. Evaluate the limit: $\lim_{x \to \infty} \dfrac{x^2 - 4x - 21}{x - 7}$

5. Determine if the following function is continuous at $x = 5$:

$$f(x) = \begin{cases} 4x + 5 & x \leq 5 \\ x^2 & x > 5 \end{cases}$$

6. What value of a makes the following function continuous?

$$g(x) = \begin{cases} \sqrt{x} & x \leq 4 \\ -x + a & x > 4 \end{cases}$$

7. Find the derivative of $f(x) = x \tan(x)$

8. Find the derivative of $f(x) = \cos(x) \cdot e^x$

9. Find the derivative of $f(x) = 3x^5 + 4x^2 + e^x$

10. Find the derivative of $f(x) = x^2 \tan(x)$

11. Use the chain rule to find the derivative of $f(x) = \sqrt{2x^3 + 4x}$

12. Use the chain rule to find the derivative of $f(x) = e^{x^2+2}$

13. Find the derivative of

$$f(x) = x^3 \cos(x)$$

14. Find the derivative of

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

15. Find the derivative of

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

16. Find the derivative of

$$f(x) = \frac{\cos(x)}{1 - \sin(x)}$$

17. Find the derivative of

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

18. Find the derivative of

$$f(x) = \sec(x)\tan(x)$$