MAC2311 Section U10
Suggested problems for Test 1
(Test 1 is Wednesday October 4th, in class)

Idris Mercer

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1. Evaluate the limit.

$$\lim_{x\to 0} \frac{6x-9}{x^3-12x+3}$$

2. Evaluate the limit.

$$\lim_{x\to 1} \frac{x^4-1}{x-1}$$

3. Evaluate the limit.

$$\lim_{x\to 2} \frac{x^2-4x+4}{x^2+x-6}$$

4. Evaluate the limit.

$$\lim_{x\to 3^+} \frac{x}{x-3}$$

5. Evaluate the limit.

$$\lim_{x\to 3^-} \frac{x}{x-3}$$

6. Evaluate the limit.

$$\lim_{x\to 2^+} \frac{x}{x^2-4}$$

7. Evaluate the limit.

$$\lim_{x\to 2^-} \frac{x}{x^2-4}$$

8. Evaluate the limit.

$$\lim_{x\to 9} \frac{x-9}{\sqrt{x}-3}$$

9. Evaluate the limit.

$$\lim_{x\to 0} \frac{\sqrt{x+4}-2}{x}$$

10. Evaluate the limit.

$$\lim_{x\to\infty} \frac{3x+1}{2x-5}$$

11. Evaluate the limit.

$$\lim_{y\to-\infty} \frac{3}{y+4}$$

12. Evaluate the limit.

$$\lim_{x\to-\infty} \frac{x-2}{x^2+2x+1}$$

13. Evaluate the limit.

$$\lim_{x\to\infty} \frac{5x^2+7}{3x^2-x}$$

14. Evaluate the limit.

$$\lim_{t\to-\infty} \frac{5-2t^3}{t^2+1}$$

15. Evaluate the limit.

$$\lim_{x\to-\infty} \frac{x+4x^3}{1-x^2+7x^3}$$

16. Evaluate the limit.

$$\lim_{x\to\infty} \sqrt{\frac{2-3x+4x^2}{1+9x^2}}$$

17. Evaluate the limit.

$$\lim_{x\to\infty} \frac{\sqrt{5x^2-2}}{x+3}$$

18. Find all values of x, if any, at which f is not continuous.

$$f(x) = (x-8)^{1/3}$$

19. Find all values of x, if any, at which f is not continuous.

$$f(x) = \frac{x+2}{x^2-4}$$

20. Find all values of x, if any, at which f is not continuous.

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

21. Find all values of x, if any, at which f is not continuous.

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

22. Find all values of x (if any) at which f is not continuous, and determine whether each discontinuity is a removable discontinuity.

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

23. Find the discontinuities, if any.

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

24. Find the discontinuities, if any.

$$f(x) = \cos\left(\frac{x}{x - \pi}\right)$$

25. Find the discontinuities, if any.

$$f(x) = |\cot x|$$

26. Find the discontinuities, if any.

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

27. Find the limit.

$$\lim_{x \to \infty} \cos\left(\frac{1}{x}\right)$$

28. Find the limit.

$$\lim_{x \to \infty} \sin\left(\frac{\pi x}{2 - 3x}\right)$$

29. Find the limit.

$$\lim_{x \to \infty} \sin^{-1}\left(\frac{x}{1 - 2x}\right)$$

30. Find the limit.

$$\lim_{x \to \infty} \ln\left(\frac{x + 1}{x}\right)$$

31. Write down the **definition** of the derivative.

32. Use the **definition** of the derivative to find the derivative of $f(x) = x^2$.

33. Use the **definition** of the derivative to find the derivative of $f(x) = \frac{1}{x}$.