

East Los Angeles College

Department of Mathematics

Math 261

Study Guide Test 1

Evaluate the following limits

1. $\lim_{x \rightarrow 2^-} \frac{4}{x-2}$

2. $\lim_{x \rightarrow \frac{\pi^-}{2}} \tan(x)$

3. $\lim_{x \rightarrow \frac{\pi^+}{2}} \sec(x)$

4. $\lim_{x \rightarrow \pi^+} \csc(x)$

5. $\lim_{x \rightarrow 0} (4x^3 - 12x + 3)$

6. $\lim_{x \rightarrow 1} \left(\frac{4x-7}{x^2-3x+2} \right)$

7. $\lim_{x \rightarrow 1} \left(\frac{x^2-1}{x^3-1} \right)$

8. $\lim_{x \rightarrow -4} \left(\frac{x^2+5x+4}{x^2+3x-4} \right)$

9. $\lim_{x \rightarrow 1} \left(\frac{|x-1|}{x-1} \right)$

10. $\lim_{x \rightarrow 1} |x - 1|$

11. $\lim_{x \rightarrow 0^+} \left(\frac{1}{x} + \frac{1}{|x|} \right)$

12. $\lim_{x \rightarrow 0^-} \left(\frac{1}{x} + \frac{1}{|x|} \right)$

$$\text{Let } f(x) = \begin{cases} \frac{1}{x^2} & \text{for } x \neq 0 \\ -2 & \text{for } x = 0 \end{cases}$$

Answer the following questions.

13. $\lim_{x \rightarrow 0^-} f(x)$

14. $\lim_{x \rightarrow 0^+} f(x)$

15. $\lim_{x \rightarrow 0} f(x)$

16. $f(0)$

17. Is the function continuous at $x = 0$, explain why or why not.

$$\text{Let } f(x) = \begin{cases} x^2 + 6 & \text{for } x \geq 2 \\ 3x + 4 & 0 < x < 2 \\ \frac{1}{x} & x < 0 \end{cases}$$

Answer the following questions.

18. $\lim_{x \rightarrow 2} f(x)$

19. $f(2)$

20. Is the function continuous at $x = 2$, explain why or why not.

21. $\lim_{x \rightarrow 0} f(x)$

22. $f(0)$

23. Is the function continuous at $x = 0$?

24. $\lim_{x \rightarrow 5} f(x)$

25. $f(5)$

26. Is the function continuous at $x = 5$? Explain why or why not.

27. Show that $\cos(x) = x$ has a solution in the interval $(0,1)$

Determine the points of discontinuity for the following functions.

28. $f(x) = \frac{x-2}{x+5}$

29. $f(x) = \frac{\sin(x)}{x^2-1}$

Determine the interval of continuity for the following functions.

30. $f(x) = 4x^3 - 12x^2 - 5x + 2$

31. $f(x) = \sqrt{x} + x^3 - 5$

32. $f(x) = \sqrt{x^2 + 4}$

33. $f(x) = \frac{x}{\sqrt{x-4}}$

34. Determine the value for c that makes the function continuous.

$$f(x) = \begin{cases} x^2 - c & \text{for } x < 5 \\ 4x + 2c & \text{for } x \leq 5 \end{cases}$$

Evaluate the following limits

35. $\lim_{x \rightarrow 3} \left(\frac{x^2 - 9}{x^2 + 2x - 3} \right)$

36. $\lim_{h \rightarrow 0} \left(\frac{\sqrt{9+h} - 3}{h} \right)$

$$37. \lim_{x \rightarrow 2} \left(\frac{x^2 - 4}{x^3 - 8} \right)$$

$$38. \lim_{h \rightarrow 0} \left(\frac{(-5+h)^2 - 25}{h} \right)$$

$$39. \lim_{x \rightarrow 4} \left(\frac{|4-x|}{4-x} \right)$$

$$40. \lim_{x \rightarrow 1} \left(\frac{1}{1-x} - \frac{2}{1-x^2} \right)$$

This is a study guide for your first Test. Your actual test will not be as long as this study guide. This is just a tool that is designed to remind you of the important points we went over in lecture.