

East Los Angeles College

Department of Mathematics

Math 261

Test 1

Show Your Work for Credit

Evaluate the following limits

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

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

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

4. $\lim_{x \rightarrow 0} (x^3 + 7x - 3)$

5. $\lim_{x \rightarrow -3} \left(\frac{|x+3|}{x+3} \right)$

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

Answer the following questions.

6. $\lim_{x \rightarrow 1} f(x)$

7. $f(1)$

8. Is the function continuous at $x = 1$, explain why or why not?

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

10. $f(0)$

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

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

13. $f(-5)$

14. Is the function continuous at -5 , explain why or why not?

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

16. $f(2)$

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

18. Show that $x^3 = 2x - 5$ has a solution in the interval $(-2,1)$.
Hint: Use the Intermediate Value Theorem

Determine the interval of continuity for the following functions.

19. $f(x) = \frac{\sqrt{x}}{x^2-4}$

Use the definition of derivative (mtan) to determine the equation of the line tangent to the curve for the following functions at the indicated points.

20. $f(x) = x^3 + 1$ at $P(1,2)$

21. $f(x) = \frac{2}{\sqrt{x+3}}$ at $P(1,1)$

Use the definition of derivative to differentiate the following function.

22. $f(x) = \frac{5}{x^2}$ at a