Time just right

MATH 131
Quiz II
September 16, 1988

Name KEY

med $\frac{14}{20}$

$\bar{X}$ 13

1. Complete the DEFinition: The function f is continuous at the point x=a means:

4

$f(a)$ is def

$\lim_{x \to a} f(x)$ exists

$f(a) = \lim_{x \to a} f(x)$

2 | 0
1 | 999
1 | 88
1 | 7
1 | 66
1 | 5555
1 | 4444
1 | 33
1 | 2
1 | 1
1 | 00

2. Use limit theorems to derive the following limits:

a. $\lim_{x \to 2} (3x - 5) =$ $\lim_{x \to 2} 3x - \lim_{x \to 2} 5$

5

$= 3 \lim_{x \to 2} x - 5 = 3(2) - 5 = 1$

1/2

2
7.7
4

b. $\lim_{x \to 2} \frac{2x^2 + 3}{x^2 - x} =$ $\frac{\lim_{x \to 2} 2x^2 + 3}{\lim_{x \to 2} x^2 - x} = \frac{\lim_{x \to 2} 2x^2 + \lim_{x \to 2} 3}{\lim_{x \to 2} x^2 - \lim_{x \to 2} x}$

5

7 got all

$= \frac{2 \lim_{x \to 2} x^2 + 3}{(\lim_{x \to 2} x)^2 - 2} = \frac{2 \cdot 2^2 + 3}{2^2 - 2} = \frac{11}{2}$

3. Evaluate the following finite or infinite limits (if two-sided limits do not exist, find one sided limits):

a. $\lim_{x \to -5} \frac{x^2 - 5}{x + 5} =$ $\lim_{x \to -5} x \dots$ ∞ $\quad \frac{20}{0}$

$\lim_{x \to -5^+} \frac{x^2 - 5}{x + 5} = +\infty \quad \frac{20}{+}$

1/2

$\lim_{x \to -5^-} \frac{x^2 - 5}{x + 5} = -\infty \quad \frac{20}{-}$

b. $\lim_{x \to 2^+} \frac{x^2 - 5}{x - 2} = -\infty$

20

most got

$\frac{4 - 5}{0} \quad \frac{-1}{+}$

c. $\lim_{x \to 4} f(x)$, where $f(x) = \begin{cases} x^2, & x \geq 4 \\ 3, & x < 4 \end{cases}$

$\lim_{x \to 4^+} f(x) = \lim_{x \to 4^+} x^2 = 16$

$\lim_{x \to 4^-} f(x) = \lim_{x \to 4^-} 3 = 3$

d. $\lim_{x \to 3^+} \left[\frac{1}{x - 3} - \frac{1}{x^2 - 9} \right] =$

1/2 got

$\lim_{x \to 3^+} \frac{x + 3 - 1}{(x - 3)(x + 3)} = \lim_{x \to 3^+} \frac{x + 2}{(x - 3)(x + 3)} = \frac{5}{0 \cdot 6} \quad \frac{+}{+ \; +} = +\infty$

4. Find the zeros and equation(s) of vertical asymptotes (if any) for $f(x) = \frac{2x}{x + 2}$. For what values of x is f discontinuous (if any)?

5

zero $x = 0$ vert asy $x = -2$ not cont $x = -2$

$< \frac{1}{2}$

5. Is the function in problem 3c continuous at 4?

2

no limit

41