MATH 131
Quiz II
February 1, 1991 Name *Key*

allowed 25 min
started to leave @ 15
several
$\frac{1}{2}$ gone by :20
20 min would be fine
almost all done by :25

Show work for full credit!

14

1. Find the following limits, if they exist (may be infinite):

4 a. $\lim\limits_{x \to 2^-} \dfrac{-x}{x-2} = +\infty$

$\dfrac{-2}{0}$

6 got all
9 more missed sign
$\frac{1}{2}$ wrong

6 b. $\lim\limits_{x \to 1} \dfrac{1-\sqrt{x}}{x-x^2} = \lim\limits_{x\to1} \dfrac{(1-\sqrt{x})(1+\sqrt{x})}{(x-x^2)(1+\sqrt{x})} = \lim\limits_{x\to1} \dfrac{1-x}{x\cancel{(1-x)}(1+\sqrt{x})}$

$= \lim\limits_{x\to1} \dfrac{1}{x(1+\sqrt{x})} = \dfrac{1}{1(1+\sqrt{1})} = \dfrac{1}{2}$ $\frac{2}{3}$

5 c. $\lim\limits_{x \to \infty} \dfrac{2x^2-5}{x-x^2} = \lim\limits_{x\to\infty} \dfrac{2-5/x^2}{\frac{1}{x}-1} = -2$ 13

or $\lim\limits_{x\to\infty} \dfrac{2x^2}{-x^2} = \lim\limits_{x\to\infty} -2 = -2$

6 2. Find a number k, if possible, so that the function f is continuous. 2

$$f(x) = \begin{cases} \dfrac{x^2-25}{x-5}, & x \neq 5 \\ k, & x = 5 \end{cases}$$

$k = \lim\limits_{x\to5} \dfrac{x^2-25}{x-5} = \lim\limits_{x\to5} \dfrac{\cancel{(x-5)}(x+5)}{\cancel{x-5}} = \lim\limits_{x\to5}(x+5) = 10$

12 3. For what values of x is the function g not continuous? Give reasons for each. Carefully sketch the graph.

3 got all
16 must got parts

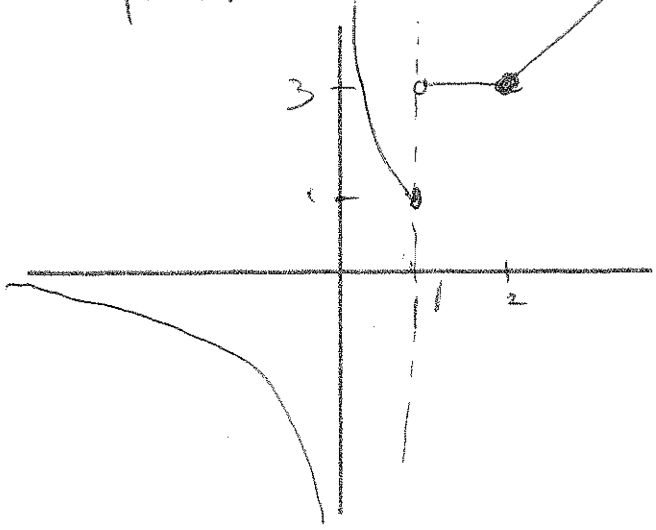
$$g(x) = \begin{cases} \dfrac{1}{x}, & x \leq 1 \\ 3, & 1 < x < 2 \\ x+1, & x \geq 2 \end{cases}$$

$x=1$ $g(1) = 1$

$\lim\limits_{x\to1^-} g(x) = \lim\limits_{x\to1^-} \dfrac{1}{x} = 1$ $\neq$

$\lim\limits_{x\to1^+} g(x) = \lim\limits_{x\to1^+} 3 = 3$

not cont



$x=0$ $g(0)$ not def

not cont

$x=2$ $g(2) = 3$

$\lim\limits_{x\to2^-} g(x) = \lim\limits_{x\to2^-} 3 = 3$

$\lim\limits_{x\to2^+} g(x) = \lim\limits_{x\to2^+} (x+1) = 3$

cont

not cont at $x = 0, 1$