

Math 157 - Quiz 3

September 4, 2013

Name key

Score _____

Show all work to receive full credit. Supply explanations when necessary.

1. (2 points) Use a table of values to guess the limit. Your table should include at least six different values of the function near the limit point.

$$\lim_{x \rightarrow 0} \frac{\frac{1}{2} - \frac{1}{x+2}}{2x}$$

IT LOOKS LIKE

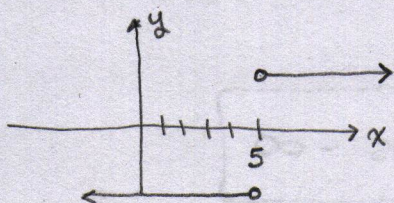
$$\lim_{x \rightarrow 0} \frac{\frac{1}{2} - \frac{1}{x+2}}{2x} = 0.125$$

x	$(\frac{1}{2} - \frac{1}{x+2}) / (2x)$
0.1	0.11905
0.01	0.12438
0.001	0.12494
-0.1	0.13158
-0.01	0.12563
-0.001	0.12506

2. (1 point) Evaluate the limit analytically: $\lim_{x \rightarrow 12} \frac{\sqrt{x-3} - 2}{x}$

$$= \frac{\sqrt{12-3} - 2}{12} = \frac{\sqrt{9} - 2}{12} = \boxed{\frac{1}{12}}$$

3. (1 point) Explain why $\lim_{x \rightarrow 5} \frac{x-5}{|x-5|}$ does not exist.



LIMIT FROM THE LEFT IS -1

LIMIT FROM THE RIGHT IS +1

4. (2 points) Evaluate the limit analytically: $\lim_{x \rightarrow -1} \frac{2x^2 - x - 3}{x+1}$

$$= \lim_{x \rightarrow -1} \frac{(x+1)(2x-3)}{(x+1)}$$

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

5. (1 point) Explain why $\lim_{x \rightarrow 4} \frac{7}{x-4}$ does not exist.

$$\lim_{x \rightarrow 4^-} \frac{7}{x-4} = -\infty$$

$$\lim_{x \rightarrow 4^+} \frac{7}{x-4} = +\infty$$

$$7/0, \frac{+}{-} = -$$

$$7/0, \frac{+}{+} = +$$

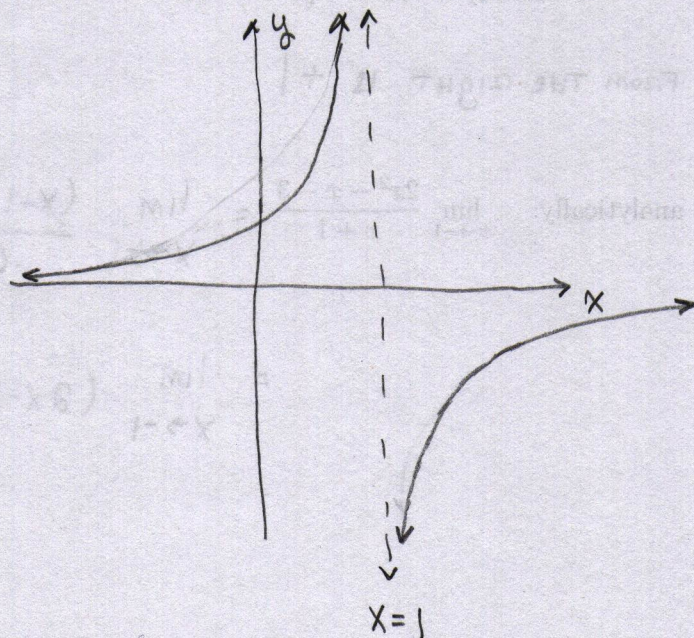
DIFFERENT LIMITS FROM DIFFERENT SIDES!

6. (1 point) Suppose $\lim_{x \rightarrow 2} f(x) = 8$. Find $\lim_{x \rightarrow 2} 10 \sqrt[3]{f(x)}$.

$$= 10 \sqrt[3]{\lim_{x \rightarrow 2} f(x)} = 10 \sqrt[3]{8} = \boxed{20}$$

7. (2 points) By sketching the graph or making a table of values, estimate the limit.

$$\lim_{x \rightarrow 1^+} \frac{9}{1-x}$$



LIMIT IS $-\infty$