

Math 171 - Quiz 2

August 30, 2012

Name key

Score _____

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

1. (2 points) Use a table of values to estimate the following limit. Your table must show function values at six or more points.

$$\text{Let } f(x) = \frac{\sin(5x^2)}{6x^2}$$

$$\lim_{x \rightarrow 0} \frac{\sin(5x^2)}{6x^2}$$

$$f(0.1) = 0.83299$$

$$f(-0.1) = 0.83299$$

$$f(0.01) = 0.83333$$

$$f(-0.01) = 0.83333$$

$$f(0.001) = 0.83333$$

$$f(-0.001) = 0.83333$$

BASED ON THE
VALUES, IT LOOKS
LIKE THE LIMIT
IS ABOUT
0.83333, OR
CLOSE TO $\frac{5}{6}$.

2. (1 point) Why can't the limit laws be used to evaluate the limit in Problem 1.

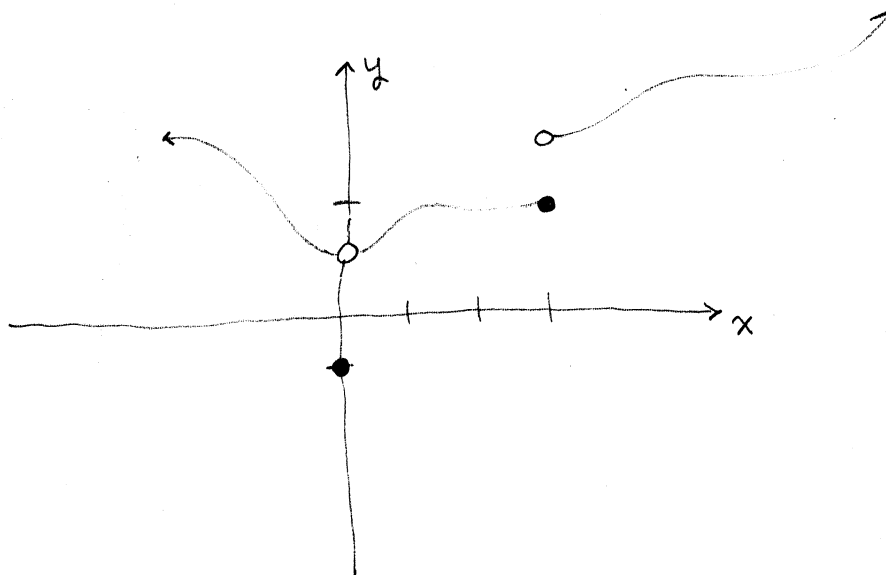
THE LIMIT OF THE DENOMINATOR IS ZERO.

THE LIMIT LAWS YIELD DIVISION BY ZERO.

3. (2 points) Sketch the graph of a function f that satisfies each of the following:

- $\lim_{x \rightarrow 3} f(x)$ DNE
- $f(3) = 2$
- $\lim_{x \rightarrow 0} f(x) = 1$
- $f(0) = -1$

ANSWERS WILL VARY.



4. (3 points) Evaluate each limit analytically. DO NOT USE A CALCULATOR.

(a) $\lim_{x \rightarrow 4} (x^2 \cos(2x) + 3 - 5\sqrt{x})$

$$= 4^2 \cos(8) + 3 - 5\sqrt{4}$$

$$= 16 \cos 8 - 7 \approx -9.328$$

(b) $\lim_{x \rightarrow 2} \frac{(x+3)(x+2)}{(x+5)(2x+1)} = \frac{(2+3)(2+2)}{(2+5)(4+1)} = \frac{20}{35} = \frac{4}{7}$

5. (2 points) In which of the four ways does each of these fail to exist? Briefly explain your reasoning.

(a) $\lim_{x \rightarrow 4} \sqrt{8-2x}$

#4 $\sqrt{8-2x}$ IS NOT DEFINED TO THE RIGHT OF 4.

(b) $\lim_{x \rightarrow 0} \frac{x^2 + 3x}{|x|}$

#1 From THE RIGHT OF $x=0$, THE LIMIT IS 3.

From THE LEFT OF $x=0$, THE LIMIT IS -3.

LIMIT FROM RIGHT \neq LIMIT FROM LEFT