

**Math 171 - Quiz 1**  
August 28, 2014

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 four or more points.

Looks like

$$\lim_{x \rightarrow 4} f(x) = 20.$$

$$\lim_{x \rightarrow 4} \frac{x^2 - 3x - 4}{\sqrt{x} - 2}$$

$$f(x) = \frac{x^2 - 3x - 4}{\sqrt{x} - 2}$$

x	f(x)
3.99	19.9475
3.999	19.9948
4.01	20.0525
4.001	20.0053

2. (6 points) Evaluate each limit analytically.

(a)  $\lim_{x \rightarrow 5} \frac{(x-4)(x+2) - 7}{x-5}$

$$= \lim_{x \rightarrow 5} \frac{x^2 - 2x - 15}{x-5} = \lim_{x \rightarrow 5} \frac{(x-5)(x+3)}{x-5} = \boxed{8}$$

(b)  $\lim_{x \rightarrow \pi} \frac{\sin x}{x} = \frac{\sin \pi}{\pi} = \frac{0}{\pi} = \boxed{0}$

(c)  $\lim_{x \rightarrow 7} \frac{\frac{1}{x} - \frac{1}{7}}{x-7} = \lim_{x \rightarrow 7} \frac{\frac{7-x}{7x}}{x-7} = \lim_{x \rightarrow 7} \frac{-1(x-7)}{7x} \cdot \frac{1}{(x-7)}$

$$= \boxed{-\frac{1}{49}}$$

3. (2 points) In which of the four ways does the following limit fail to exist? Briefly explain your reasoning.

$$\lim_{x \rightarrow 0} \frac{(x+1)|x|}{x}$$

LIMIT FROM LEFT

≠

LIMIT FROM RIGHT

$$\frac{(x+1)|x|}{x} = \begin{cases} -(x+1) & \text{if } x < 0 \\ x+1 & \text{if } x > 0 \end{cases}$$

LEFT OF  $x=0$

$$\frac{(x+1)|x|}{x} \rightarrow -1 \text{ AS } x \rightarrow 0$$

RIGHT OF  $x=0$

$$\frac{(x+1)|x|}{x} \rightarrow 1 \text{ AS } x \rightarrow 0$$