

Math 171 - Quiz 3

September 5, 2013

Name key

Score _____

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

1. (2.5 points) Evaluate the limit: $\lim_{x \rightarrow 2} \frac{2x-4}{x^2+x-6}$ % more work

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

2. (2.5 points) Evaluate the limit: $\lim_{h \rightarrow 0^+} \frac{(2+h)^2-4}{2h}$ % More work

$$= \lim_{h \rightarrow 0^+} \frac{4+4h+h^2-4}{2h} = \lim_{h \rightarrow 0^+} \frac{4h+h^2}{2h}$$
$$= \lim_{h \rightarrow 0^+} \frac{4+h}{2} = \boxed{2}$$

3. (2.5 points) Evaluate the limit: $\lim_{x \rightarrow 1^-} \frac{(x-1)(x+5)}{|x-1|}$ % More work

For $x < 1$, $|x-1| = -(x-1)$

$$\lim_{x \rightarrow 1^-} \frac{\cancel{(x-1)}(x+5)}{-\cancel{(x-1)}} = \lim_{x \rightarrow 1^-} \frac{(x+5)}{-1} = \boxed{-6}$$

4. (2.5 points) Find k so that $\lim_{x \rightarrow 2} g(x)$ exists.

$$g(x) = \begin{cases} 1 + \frac{3 \sin(x-2)}{x-2}, & x \leq 2 \\ kx^2 + 3x - 5, & x > 2 \end{cases}$$

$$\lim_{x \rightarrow 2^-} g(x) = \lim_{x \rightarrow 2} \left(1 + \frac{3 \sin(x-2)}{x-2} \right) = 1 + 3 = 4$$

$$\lim_{x \rightarrow 2^+} g(x) = \lim_{x \rightarrow 2} (kx^2 + 3x - 5) = k(4) + 6 - 5 = 4k + 1$$

$$4k + 1 = 4 \Rightarrow \boxed{k = \frac{3}{4}}$$