Math 171 - Quiz 2

Name __key__

September 4, 2014

Score _____

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

1. (2.5 points) Find the limit analytically: $\frac{0}{0}$ MORE WORK

$$\lim_{x \to -5^+} \frac{x^2 + 7x + 10}{x + 5} = \lim_{x \to -5^+} \frac{(x+5)(x+2)}{x+5}$$

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

2. (2.5 points) Find the limit analytically: $\frac{0}{0}$ MORE WORK

$$\lim_{x \to 2^-} \frac{(x - 2)(x^2 + 7)}{|x - 2|}$$

$$= \lim_{x \to 2^-} \frac{(x-2)(x^2+7)}{-(x-2)}$$

To THE LEFT OF $X = 2$,

$|x - 2| = -(x - 2)$

$$= \lim_{x \to 2} -(x^2 + 7) = \boxed{-11}$$

3. (2.5 points) Find k so that $\lim_{x \to 1} f(x)$ exists.

$$f(x) = \begin{cases} 4x + 3 + \sin \pi x, & x < 1 \\ x^2 + kx - 2, & x > 1 \end{cases}$$

$\lim_{x \to 1^-} f(x) = \lim_{x \to 1} (4x + 3 + \sin \pi x) = 7$

$\lim_{x \to 1^+} f(x) = \lim_{x \to 1} (x^2 + kx - 2) = k - 1$

$\left. \begin{array}{c} \\ \\ \end{array} \right\}$ $k - 1 = 7 \Rightarrow \boxed{k = 8}$

4. (2.5 points) Referring to the problem above, explain how you know that $f(x)$ is continuous whenever $x > 1$ regardless of the value of k.

For $x > 1$, $f(x) = x^2 + kx - 2$.

THIS IS A POLYNOMIAL, REGARDLESS OF k's VALUE.

POLYNOMIALS ARE CONTINUOUS.