Math 157 - Quiz 3

September 10, 2014

Name key

Score _____

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

1. (2 points) Suppose f is a continuous function whose value at $x = 5$ is pretty close to 1.75. What can you say about its value at $x = 4.999999$? Explain your reasoning.

SINCE f IS CONTINUOUS, SMALL CHANGES IN INPUT RESULT IN SMALL CHANGES IN OUTPUT. THEREFORE, ALL WE CAN REALLY SAY IS THAT $f(4.999999)$ IS CLOSE TO $f(5) \approx 1.75$.

2. (3 points) Use algebra to find the limit analytically.

$$\lim_{x\to 5} \frac{x^2 - 7x + 10}{x^2 - 4x - 5} = \lim_{x\to 5} \frac{(x-5)(x-2)}{(x-5)(x+1)}$$

$$= \lim_{x\to 5} \frac{x-2}{x+1} = \frac{3}{6} = \boxed{\frac{1}{2}}$$

3. (3 points) What is the easiest way to compute $\lim_{x\to 1}(3x^2 - 7x + 8)$? Why does your method work?

SUBSTITUTE $x=1$ INTO THE EXPRESSION.

$$\lim_{x\to 1} (3x^2 - 7x + 8) = 3(1)^2 - 7(1) + 8$$

$$= \boxed{4}$$

IT WORKS BECAUSE THE FUNCTION IS CONTINUOUS.

4. (2 points) Use a table of values to estimate the limit.

$$\lim_{x\to 0} \frac{5^x - 1}{4x}$$

x	$\frac{5^x - 1}{4x}$
0.1	0.4365
0.01	0.4056
0.001	0.4027
-0.1	0.3717
-0.01	0.3991
-0.001	0.4020

LOOKS LIKE

$$\lim_{x\to 0} \frac{5^x - 1}{4x} \approx 0.402$$