

# Math 157 - Quiz 4

September 23, 2015

Name key

Score \_\_\_\_\_

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

1. (4 points) The table belows gives the values of the function  $f$  at selected points. Use the data in the table to find a reasonable approximation for the instantaneous rate of change of  $f$  at  $x = 1$ .

$x$	0.8	0.9	1.0	1.1	1.2
$f(x)$	0.974	0.946	0.909	0.863	0.808

THE BEST APPROX

WE CAN MAKE WITH

THIS DATA IS

$$f'(1) \approx \frac{f(1.1) - f(0.9)}{1.1 - 0.9} = \frac{0.863 - 0.946}{0.2} = -0.415$$

2. (6 points) Let  $f(x) = \frac{x}{x-1}$ . By computing rates of change over smaller and smaller intervals, estimate the instantaneous rate of change of  $f$  at  $x = 3$ . (You must consider at least 4 intervals to receive full credit.)

$$[2.9, 3.1] \Rightarrow \frac{f(3.1) - f(2.9)}{3.1 - 2.9} \approx -0.2506266$$

$$[2.99, 3.01] \Rightarrow \frac{f(3.01) - f(2.99)}{3.01 - 2.99} \approx -0.2500625$$

$$[2.999, 3.001] \Rightarrow \frac{f(3.001) - f(2.999)}{3.001 - 2.999} \approx -0.25000625$$

$$[2.9999, 3.0001] \Rightarrow \frac{f(3.0001) - f(2.9999)}{3.0001 - 2.9999} \approx -0.25000001$$

LOOKS LIKE  $f'(3) = -0.25$