Math 220 Section 6 Quiz 3

16 September 2015

Name: Answer Key

1. Find the slope of the tangent line to the graph $f(x) = \frac{x}{x-1}$ when $x = 2$.

$$m = f'(2) = \lim_{x\to 2} \frac{\frac{x}{x-1} - 2}{x-2} = \lim_{x\to 2} \frac{\frac{x}{x-1} - \frac{(2x-2)}{x-1}}{x-2}$$

$$= \lim_{x\to 2} \frac{\frac{-x+2}{x-1}}{x-2} = \lim_{x\to 2} \frac{-1}{x-1} = \frac{-1}{1} = -1$$

OR

$$f'(2) = \lim_{h\to 0} \frac{\frac{2+h}{2+h-1} - 2}{h} = \lim_{h\to 0} \frac{\frac{2+h}{1+h} - \frac{(2+2h)}{1+h}}{h}$$

$$= \lim_{h\to 0} \frac{\frac{-h}{1+h}}{h} = \lim_{h\to 0} \frac{-1}{1+h} = -1$$