QUIZ # 2

MATH 132 WI01

Name (1p): .....

Problem (9p): Find the equation of the tangent line to the following curve at the given point.

$$f(x) = \frac{x}{x+1}$$

$$(-2, 2)$$

Answer: we need the slope - and we'll use definition this time:

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

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

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

Based on this and on the fact that we have the point $(-2, 2)$ we get the equation to be:

$$y - 2 = 1 \cdot (x - (-2)) = (x + 2)$$

Of course, at this point you are able to compute the derivative using the rules, so, using the Quotient Rule, we get:

$$f'(x) = \frac{1 \cdot (x+1) - x \cdot 1}{(x+1)^2} = \frac{x+1-x}{(x+1)^2} = \frac{1}{(x+1)^2}$$

and plugging in -2 we get $f'(-2) = \frac{1}{(-2+1)^2} = \frac{1}{(-1)^2} = 1$ for the slope ...

Date: 01/18/2001.