

MATH 131
 Quiz III
 February 8, 1991

Name _____

a little short
 T 22.3
 in 23.5
 Key

attended 23 min
 First left at 10:30
 8/28 left by 15
 median time 18
 almost all by 22

You may use formulas in all questions except #4.

1. Complete the following DEFINITION: The derivative f' of the function f is given by

$f'(x) =$ *most left of limit*

(13)/28

2. Find the following limits (if they exist. May be infinite):

a. $\lim_{x \rightarrow -1^+} \frac{x}{x+1} = \frac{-1}{+1} = -1$
 $-1, 99+1 \Rightarrow 0$

11
 may get wrong sign

b. $\lim_{x \rightarrow 0} \frac{x+x^2}{x} = \lim_{x \rightarrow 0} \frac{x(1+x)}{x} = 1+0=1$

most

3. Find the derivative of each of the following functions (Do NOT simplify):

a. $f(x) = 8x^2 + 3x - 3\sqrt{x} + \frac{1}{x} - 2$, $f'(x) = 16x + 3 - \frac{3}{2}x^{-1/2} - x^{-2}$
 $8x^2 + 3x - 3x^{1/2} + x^{-1} - 2 = 16x + 3 - \frac{3}{2\sqrt{x}} - \frac{1}{x^2}$

correct all

b. $y = x^2(x-1)$, $\frac{dy}{dx} = 3x^2 - 2x$
 $x^3 - x^2$

all but 1

4. Using only the definition find $f'(x)$ where $f(x) = \sqrt{2x+1}$.

$$\begin{aligned} \lim_{\Delta x \rightarrow 0} \frac{f(x+\Delta x) - f(x)}{\Delta x} &= \lim_{\Delta x \rightarrow 0} \frac{\sqrt{2(x+\Delta x)+1} - \sqrt{2x+1}}{\Delta x} \\ &= \lim_{\Delta x \rightarrow 0} \frac{2x+2\Delta x+1 - (2x+1)}{\Delta x (\sqrt{2(x+\Delta x)+1} + \sqrt{2x+1})} \\ &= \lim_{\Delta x \rightarrow 0} \frac{2\Delta x}{\Delta x (\sqrt{\quad} + \sqrt{\quad})} \\ &= \lim_{\Delta x \rightarrow 0} \frac{2}{\sqrt{2(x+\Delta x)+1} + \sqrt{2x+1}} = \frac{2}{2\sqrt{2x+1}} \\ &= \frac{1}{\sqrt{2x+1}} \end{aligned}$$

most missed this, but did ok in class
 S good all
 S most close

10 min to here.