1:55
time OK
started to hand out at 11:00
5 by 12:00
$\frac{1}{2}$ by 17:00
$\frac{17}{25}$ by 20:00
$\frac{21}{25}$ by 25:00
allow 28:00

MATH 131
Quiz IV
September 25, 1992

Name Key

1. Find the following derivatives:

4 ea

a. $f''(x)$, when $f(x) = -3x^5 + x^2 - \frac{3}{x^3} + 4\sin x$ $\quad -3x^{-3}$

$f'(x) = -15x^4 + 2x + 9x^{-4} + 4\cos x$ more space

$f''(x) = -60x^3 + 2 - 36x^{-5} - 4\sin x$ a few 19 got all

no one missed

b. $f'(x)$, when $f(x) = (x^2 - 2)(x^3 + 2x^2 + 3x - 3)$ almost all

$(x^2-2)(3x^2+4x+3) + (x^3+2x^2+3x-3)(2x)$

Some multiplied out

c. $y = \dfrac{x^2+2}{x^2-2}$, $\dfrac{dy}{dx} = \dfrac{(x^2-2)(2x) - (x^2+2)(2x)}{(x^2-2)^2}$ almost all Some got backward

$= \dfrac{2x^3-4x - 2x^3-4x}{(\quad)^2} = \dfrac{-8x}{(x^2-2)^2}$

d. $y = \tan x + 2\sec x$, $\dfrac{dy}{dx} = \sec^2 x + 2\sec x\tan x$ all but 3

do a co next time

5 ~~4~~

2. Find the equation of the straight line tangent to the curve $y = x^2 - 3$ when $x = 1$.

16 got all
no one but x^2 in eq

$\frac{dy}{dx} = 2x$ $\qquad y = -2$

$m = 2(1) = 2$ $\qquad y+2 = 2(x-1)$

$y+2 = 2x-2$

$y = 2x-4$

~~4~~

3. The position of an object above the ground is given by $s = 200 + 20t - 16t^2$, where s is in feet and t is time in seconds. What is the velocity and acceleration when $t = 2$? Is the object going up or down then?

9 got all
most got most
some no units

$v = \frac{ds}{dt} = 20 - 32t$ Some $t=0$ $\quad v = -44$ ft/sec

$a = \frac{dv}{dt} = -32$ $\quad a = -32$ ft/sec/sec

all $\quad$ down

5

4. Using only the *definition*, find $f'(1)$ (if it exists) when
$f(x) = \begin{cases} x^2 & , x < 1 \\ 2x-1, & x \geq 1 \end{cases}$

usually put in x

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

$\lim_{h\to 0^-} \dfrac{f(1+h)-f(1)}{h} = \lim_{h\to 0^-} \dfrac{(1+h)^2-1}{h} = \lim_{h\to 0^-} \dfrac{\cancel{1}+2h+h^2-\cancel{1}}{h}$ x^2

$= \lim_{h\to 0^-} \dfrac{\cancel{h}(2+h)}{\cancel{h}} = 2$

lots did one side

$f'(1) = 2$