MATH 131
Quiz IV
February 15, 1991

Name Key

Time OK allowed 22 min started to leave @ 13 min ½ left by 22 min all by 25

Use straight edge! Give units in answers.

$\bar{x} = 244/30$ med = 25

1. Find each derivative:

a. $f(x) = \sqrt{x} + x^4 - 2x + x^{-1}$, $f''(x) =$

$x^{1/2} + x^4 - 2x + x^{-1}$

$f'(x) = \frac{1}{2}x^{-1/2} + 4x^3 - 2 - x^{-2}$

$\frac{1}{2}\left(-\frac{1}{2}\right)x^{-3/2} + 4\cdot 3x^2 - (-2)x^{-3}$

$= -\frac{1}{4}x^{-3/2} + 12x^2 + 2x^{-3}$

$= -\frac{1}{4x\sqrt{x}} + 12x^2 + \frac{2}{x^3}$

all but 5

b. $y = \dfrac{x^4 + 2x - 2}{x^2 + x}$, $\dfrac{dy}{dx} =$ ~~$\frac{2}{(x^2+x)}$~~

$$\frac{(x^2+x)(4x^3+2) - (x^4+2x-2)(2x+1)}{(x^2+1)^2}$$

all but 5
most missed sign

c. $f(x) = (x^3 + 1 + \sqrt{x} - x)(x^2 + 2x + 7)$, $f'(x) =$

$= (x^3 + 1 + x^{1/2} - x)(x^2 + 2x + 7)$

$(x^3 + 1 + x^{1/2} - x)(2x + 2)$

$+ (x^2 + 2x + 7)(3x^2 + \frac{1}{2}x^{-1/2} - 1)$

all but 1

2. The height of an object after t seconds is given by $h = 60 + 50t - 16t^2$ (feet).

a. What is the initial position and velocity?

b. What is the velocity and acceleration when t = 1?

c. Is the object going up or down when t = 2?

$V = 50 - 32t$

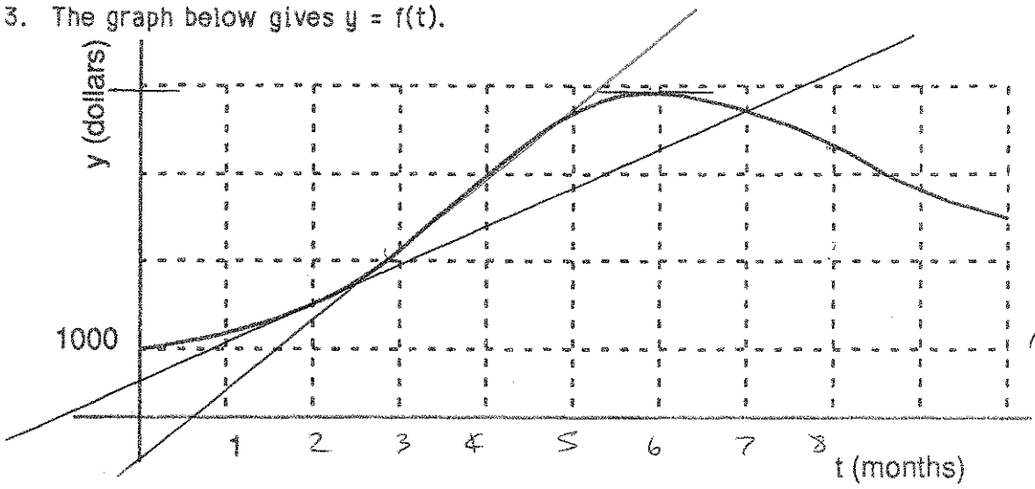
a. $t=0$ $h = 60$ ft $v = 50$ ft/sec $a = -32$

b. $t=1$ $V = 50 - 32 = 18$ ft/sec $a = -32$ ft/sec²

c. $t = 2$ $V = 50 - 64 < 0$ Down

4 got all
must had reasons

3. The graph below gives y = f(t).



4 got all
must had good lines.

From the graph carefully estimate:

a. f(8) b. f'(3) ← many missed idea, but got c.

c. The instantaneous rate of change of y when t = 2.

d. The maximum value of y.

a. $f(8) = \$3300$ b. $f'(3)$ $(3, 2100)$ $(5, 3800)$ $f'(3) = \frac{3800 - 2100}{5 - 3} = \frac{1700}{2} = \$850$ /mo

c. $(2, 1500)(7, 3800)$ $\frac{3800 - 1500}{7 - 2} = \frac{2300}{5} = 460$ \$/mo

do a neg slope

Do a tangent line!

d. $\$3800$