started lesson of 15 min (started early)

MATH 131
Quiz III
September 23, 1988

Name KEY

$\bar{x}$ 15.6/20

med 17/20

1. Solve for x:

5

$$\frac{x^2(x+2)}{x-1} \geq 0 \qquad x=0,\ x=-2\quad x=1$$

$-2 \quad 0 \quad 1$

$+ \quad + \quad - \quad +$

~~$(-\infty, 0] \cup (1, \infty)$~~

$(-\infty, -2] \cup \{0\} \cup (1, \infty)$

½

2. Between what two integers do we know that $\sqrt{234}$ falls? Show reasons.

3

$x^2 - 234 = 0$

$x = 15 \quad x^2 = 225 \quad -$

$x = 16 \quad x^2 = 256 \quad +$

once unclear trying to do first (round a [illegible])

3. Find the equation of the straight line tangent to the curve $y = x^3$ at the point (2,8). [You may use formulas in this problem.]

5

$$\frac{dy}{dx} = 3x^2 \qquad y - 8 = 12(x-2)$$

$$m = 3(2)^2 = \boxed{12} \qquad y = 12x - 24 + 8$$

$$y = 12x - 16$$

must get

4. Using only the definition, find:

10

a. $f'(2)$, when $f(x) = 3x^2 - 2$. [You may find $f'(a)$ or $f'(x)$ first if you wish.]

b. $f'(a)$, when $f(x) = \sqrt{x}$. [Or find $f'(x)$ if you want.]

[If you can't do this, find $f'(4)$ for partial credit.]

a. $$f'(2) = \lim_{x\to 2} \frac{(3x^2-2) - (3(2)^2-2)}{x-2} = \lim_{x\to 2}\frac{3x^2 \cancel{-2} - 12 \cancel{+2}}{x-2}$$

must get ½ find f'(t)

$$= \lim_{x\to 2}\frac{3(x^2-4)}{x-2} = \lim_{x\to 2}\frac{3\cancel{(x-2)}(x+2)}{\cancel{x-2}} = 3(2+2) = 12$$

b. $$f'(a) = \lim_{x\to a}\frac{\sqrt{x}-\sqrt{a}}{x-a}\cdot\frac{\sqrt{x}+\sqrt{a}}{\sqrt{x}+\sqrt{a}} = \lim_{x\to a}\frac{\cancel{x-a}}{\cancel{(x-a)}(\sqrt{x}+\sqrt{a})}$$

t

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