NAME: KEY Period:

Sheet #1210 = REVIEW DIFFERENTIAL CALCULUS

1. FIND $\lim_{x\to\infty} f(x)$ FOR

a, $f(x) = \dfrac{x^2-3x+4}{3x^3-5}$ $\boxed{0}$

b, $f(x) = \dfrac{2x^2-14}{x+2}$ $\boxed{\infty}$

c, $f(x) = \dfrac{4x^3-12}{-2x^3+x-5}$ $\boxed{-2}$

d, DO ANY ANSWERS CHANGE FOR $x\to-\infty$. YES. b, $\to$ $\boxed{-\infty}$

2. a, FIND TANGENT LINE TO

$f(x) = x^3-8$ FOR $x=1$ $\boxed{y+7=3(x-1)}$

$f'(x) = 3x^2$ $f'(1)=3$

$f(1)=-7$

b, USE TANGENT LINE TO ESTIMATE

$f(1.1)$. $7+3(1.1-1) = -7+0.3 = -7.3$

$-7+3(.1)=-7+.3=-6.7$

3a, FIND $\frac{dy}{dx}$ FOR $x^3y^2+x^2y=2$

$3x^2\cdot y^2 + x^3\,2yy' + 2xy + x^2y' = 0$

$y'(2x^3y+x^2) = -3x^2y-2xy$

$y' = \dfrac{-3x^2y^2-2xy}{2x^3y+x^2}$

b, FIND dy/dx AT $(1,1)$.

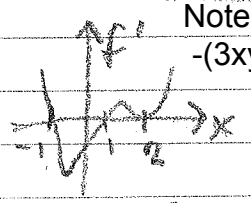
$3+2y'+2+y'=0$ $y' = \boxed{\dfrac{-5}{3}}$

$\boxed{y' = \dfrac{-(3xy+2)y}{(2xy+1)x}, \quad x\neq 0}$

Note:
-(3xy+2)y in numerator

4. FIND CRITICAL POINTS, MAX, MIN AND POINTS OF INFLECTION FOR $f(x)$ IF

$f'(x) = (x+1)(x-1)(x-2)^2$



$f'(x)=0$ When $x=-1$, $x=1$, $x=2$.

MAX: $x=-1$ f' FROM POS. TO NEG.

MIN: $x=1$ f' FROM NEG. TO POS.

P.I: $x=2$ f' BOUNCE. (LOCAL MIN FOR f')

$x=-0.366$ f' MIN

$x=1.366$ f' MAX.