MATH 131
Quiz 6
October 31, 1997

Name Key

Attend 25m Fast @ 16
23, 25, 25, 25, 25, 26, 26, 27
(27) 9 of 30
$\bar{x} = 25.57/30$
$m = 26$

13

1. Find the second derivative of each:

a. $f(x) = x^3 - 3x^2 + 1/x$

$f'(x) = 3x^2 - 6x - x^{-2}$

$f''(x) = 6x - 6 + 2x^{-3} = 6x - 6 + \frac{2}{x^3}$

a/pw

almost all

b. $f(x) = \cos(3x)$

$f'(x) = -\sin(3x) \cdot 3$

$f''(x) = -\cos(3x) \cdot 9 = -9\cos(3x)$

almost all (some chain)

c. $y = x \sin x$

$\frac{dy}{dx} = x\cos x + \sin x$

most

$\frac{d^2y}{dx^2} = x(-\sin x) + \cos x + \cos x = -x\sin x + 2\cos x$

5

2. Use Newtons method to find the critical point of $f(x) = x^2 - \sin x$. Show or describe work.

$f'(x) = 2x - \cos x$ $\quad 1 \Rightarrow x$

$f''(x) = 2 + \sin x$ $\quad x - y_1/y_2 \Rightarrow x$

.450183113 after 4 iter

4 all

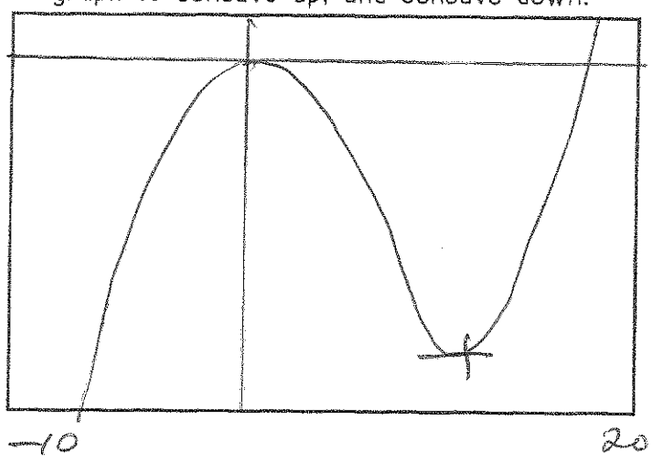
10

3. For the function $f(x) = 2x^3 - 33x^2$

a. Graph the function in an appropriate window and copy that here.

b. Give coordinates of local (relative) maxima and minima (of any), and the intervals on which the function is increasing, and decreasing.

c. Give coordinates of points of inflection (if any), and intervals on which the graph is concave up, and concave down.



$f'(x) = 6x^2 - 66x$

$6x(x-11) = 0$

$x = 0, 11$

$f''(x) = 12x - 66 = 0$

$x = \frac{66}{12} = \frac{11}{2}$

$(0,0)$ $(11, -1331)$

$\left(\frac{11}{2}, -665.5\right)$

good

17 all

max $(0,0)$

min $(11, -1331)$

I $(-\infty, 0]$, $[11, \infty)$

D $[0, 11]$

PI $\left(\frac{11}{2}, -666.5\right)$

CC ↑ $x > \frac{11}{2}$ CC ↓ $x < \frac{11}{2}$