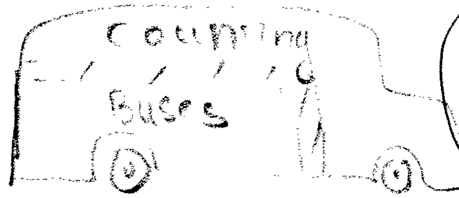
2.10.2



HW #9

Use the mean value theorem:

$f(x) = x^2 + 1$, $[0, 2]$ Find Number "c"

$f'(x) = 2x$: there is a number "c" in $[0, 2]$

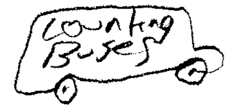
$$f'(c) = \frac{f(2) - f(0)}{2 - 0} = \frac{4}{2} = 2$$

To find c we set:

$$f'(c) = 2c = 2$$

so $c = \frac{2}{2} = 1$

2.10 - 2



HW #9

2. $f(x) = x^2 + 1,\ [0, 2]$

$$f'(c) = \frac{f(2) - f(0)}{2 - 0} =$$

$$2c = \frac{5 - 1}{2 - 0} = 2$$

$$c = 1$$

DGK

4) $F(x) = x^3 + x^2 \quad [-1, 1]$

$$F'(c) = \frac{F(1) + f(-1)}{1+1} = \frac{2+0}{2} = 1$$

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

$$3(-1)^2 + 2(-1) =$$

$$3 - 2 = 1$$

$$3x^3 + 2x^2 - 1 = 0$$

$$\frac{-2 \pm \sqrt{2^2 - 4(3)(-1)}}{2(1)} =$$

$$= \frac{-2 \pm \sqrt{4 - 12}}{2}$$

$$c = \frac{-2 \pm \sqrt{-8}}{2}$$

Double Helix

HW#10

p. 208 # 84

Find a value of c as garunteed by the Mean Value Theorem

$f(x) = x^3 - x$ on interval $[0, 2]$

$f'(c) = \frac{f(2)-f(0)}{2-0} = \frac{(2^3-2)-(0^3-0)}{2} = \frac{6}{2} = 3$

$f'(c) = d/dc(c^3 - c)$

$f'(c) = 3c^2 = 3$

$c^2 = 1$

$c = \sqrt{1}$

$c = 1$ b/c it's between $[0,2]$

page 220 / section 3-1 / 2

#2) $f(x) = (x+1)^{\frac{1}{3}}$ $x_0 = 0;\ \sqrt[3]{1.2}$

$f(0) = (0+1)^{\frac{1}{3}}$

$f(0) = 1$ $(0;1)$

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

$f'(0) = \frac{1}{3} = m$

$y - 1 = \frac{1}{3}(x - 0)$

$y = \frac{1}{3}x + 1$

$y(0.2) = \frac{1}{3} \cdot (0.2) + 1$

$= 1.0666$ from calc 1.062

INVESTMENT BANKERS

3.1 Use linear approximation to estimate the quantity.

8. (a) sin (0.1) (b) sin (1.0) (c) sin $(\frac{9}{4})$

a. Find the linear approximation of $f(x) = \sin x$, at $x_0 = 0$.

$$f(x) = f(x_0) + f'(x_0)(x - x_0)$$

$$f(0.1) = \sin(0) + \cos(0)(0.1 - 0)$$

$$f(0.1) = 0 + 1(0.1)$$

$$f(0.1) = 0.1$$

b. Find the linear approximation of $f(x) = \sin x$, at $x_0 = \frac{\pi}{3}$.

$$f(x) = f(x_0) + f'(x_0)(x - x_0)$$

$$f(1.0) = \sin\left(\frac{\pi}{3}\right) + \cos\left(\frac{\pi}{3}\right)\left(1.0 - \frac{\pi}{3}\right)$$

$$f(1.0) = \frac{\sqrt{3}}{2} + \frac{1}{2}(-0.04719\,...)$$

$$f(1.0) \approx 0.84242\,...$$

c. Find the linear approximation of $f(x) = \sin x$, at $x_0 = \frac{3\pi}{4}$.

$$f(x) = f(x_0) + f'(x_0)(x - x_0)$$

$$f\left(\frac{9}{4}\right) = \sin\left(\frac{3\pi}{4}\right) + \cos\left(\frac{3\pi}{4}\right)\left(\frac{9}{4} - \frac{3\pi}{4}\right)$$

$$f\left(\frac{9}{4}\right) = \frac{\sqrt{2}}{2} + \left(-\frac{\sqrt{2}}{2}\right)(-0.10619\,...)$$

$$f\left(\frac{9}{4}\right) \approx 0.78219\,...$$

Section 3.1 i.t.

14

Use newton's method with the given X_0 to (a) compute X_1 and X_2 by hand and (b) use a calculator to find the root to at least five decimal places of accuracy

$X^3+4x^2-x-1=0 \quad X_0=-1$

$$=x_n-\frac{X_n^3+4x_n^2-x_n-1}{3x_n^2+8x_n-1}$$

$X_1=-5$ $\quad X_1=-5-\dfrac{(-5)^3+4(-5)^2-(-5)-1}{3(-5)^2+8(-5)-1}=-4.36235\ldots$

$X_2\doteq-4.4$ $\quad X_2=-4.4-\dfrac{(-4.4)^3+4(-4.4)^2-(-4.4)-1}{3(-4.4)^2+8(-4.4)-1}=-4.18207\ldots$

$X_3=-4.1$

from calc $\quad$ Root $=-4.18194\ldots$

MAT Finisher

16

~~$f(x) = \sin 3x,\ X_0 = 0,\ \sin(0,3)$~~

Equation of line tangent to $y > x^2 - 9$

$L_1 : y + 8 = 2(x-1)$ $\quad y' = 2x$

$y = 2(x-1) - 8$ $\quad m = y'(1) = 2$

point $(1, -8)$

Zero for L_1 $\quad 0 = 2(x-1) - 8$

$8 = 2(x+1)$

$4 = x - 1$

$5 = x$

M. Sh[illegible] $\quad$ Hiroaki Tomioka

PURPLE PARROTS

3.1

Newtons method

32. $4x^3 - 7x^2 + 1 = 0 \quad x_0 = 1$

$$x_0 - \frac{f(x_0)}{f'(x_0)}$$

H.W

X - July

3.2 = $\boxed{6}$.

6 $\lim_{t \to 0} \dfrac{\sin t}{e^{3t} - 1}$

$\lim_{t \to 0} \dfrac{d/dx \ \sin t}{d/dx \ e^{3t} - 1}$

$= \lim_{t \to 0} \dfrac{\cos t}{e^{3t}}$

$= \dfrac{\cos(0)}{e^{3(0)}}$

$= 1/1$

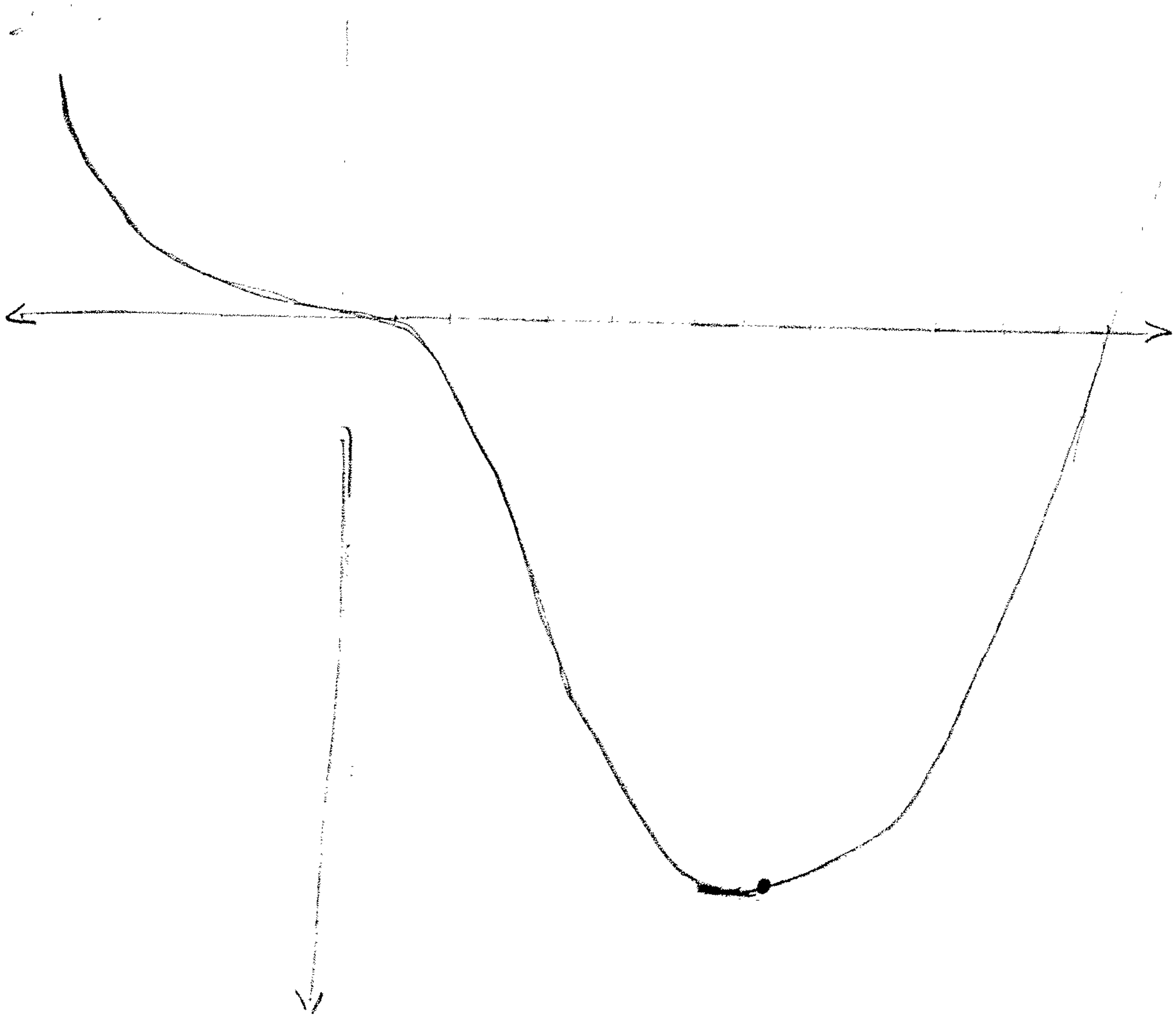
$= \boxed{1}$.

Abraham Sherman
Timothy Lakowicz

Beachomists

Approximate the X-Coordinates and Sketch

21. $Y_1 = x^4 - 16x^3 - 0.1x^2 + 0.5x - 1$



2ND CALC MINIMUM

Xmax = 12.003299