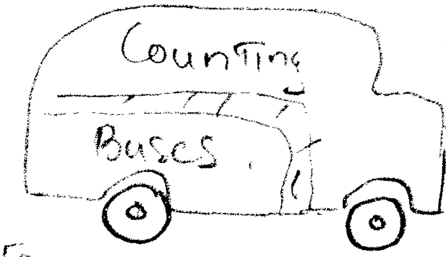
~ 2.1 10 Homework # 4



HW #4

$f(x) = \sqrt{x^2+1}$

a) $A_1(1,\sqrt{2})$, $A_2(2,\sqrt{5})$ $\Rightarrow$ $M_{sec} = \frac{\sqrt{5}-\sqrt{2}}{2-1} = 0.823..$

b) $A_2(2,\sqrt{5})$ $B(3,\sqrt{10})$ $\Rightarrow$ $M_{sec} = \frac{\sqrt{10}-\sqrt{5}}{3-2} = 0.926..$

c) $C(1.5,\sqrt{3.5})$ $A_2(2,\sqrt{5})$ $\Rightarrow$ $M_{sec} = \frac{\sqrt{5}-\sqrt{3.5}}{2-1.5} = 0.734..$

d) $A_2(2,\sqrt{5})$, $D(2.5,\sqrt{7.5})$ $\Rightarrow$ $M_{sec} = \frac{\sqrt{7.5}-\sqrt{5}}{2.5-2} = 1.00..$

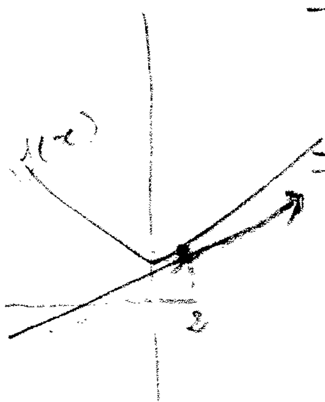
e) $E(1.9,\sqrt{4.61})$ $A_2(2,\sqrt{5})$ $\Rightarrow$ $M_{sec} = \frac{\sqrt{5}-\sqrt{4.61}}{2-1.9} = 0.889..$

f) $A_2(2,\sqrt{5})$ $F(2.1,\sqrt{5.41})$ $\Rightarrow$ $M_{sec} = \frac{\sqrt{5.41}-\sqrt{5}}{2.1-2} = 0.898$

(g) Slope of the tangent line at $x=2$

$$M_{tan} = \lim_{h\to 0} \frac{f(a+h)-f(a)}{h} = \lim_{h\to 0} \frac{\sqrt{(2+h)^2+1}-\sqrt{2^2+1}}{h}$$

$$= \lim_{h\to 0} \frac{\sqrt{h^2+2h+5}-\sqrt{5}}{h}$$



$$= \lim_{h\to 0} \frac{\sqrt{h^2+2h+5}-\sqrt{5}}{h} \times \frac{\sqrt{h^2+2h+5}+\sqrt{5}}{(\sqrt{h^2+2h+5}+\sqrt{5})}$$

$$= \lim_{h\to 0} \frac{h^2+2h+5-5}{h(\sqrt{h^2+2h+5}+\sqrt{5})}$$

$$= \lim_{h\to 0} \frac{h(h+2)}{h(\sqrt{h^2+2h+5}+\sqrt{5})}$$

$$M_{tan} = \lim_{h\to 0} \frac{h+2}{\sqrt{h^2+2h+5}+\sqrt{5}} = \frac{0+2}{\sqrt{0+0+5}+\sqrt{5}} = \frac{1}{\sqrt{5}}$$

16. $s(t) = 4t - 4.9t^2$ DGIS

$s' = v = 4 - 9.8t$

$t = 0, \quad v = 4$

$t = 1, \quad v = 4 - 9.8 = -5.8$

$$\lim_{h \to 0} \frac{s(a+h) - s(a)}{a+h-a} = \lim_{h \to 0} \frac{s(a+h) - s(a)}{h}$$

$$\lim_{h \to 0} s(4(1) - 4.9(1)^2)$$

$$\frac{s(1) - s(0)}{1 - 0} = 4(1) - 4.9(1) - 4(0) - 4.9(0) = .9$$

$$v(.9) = \lim_{h \to 0} \frac{(.9 + h) - s(.9)}{(.9 + h) - .9}$$

$.81 - .9h + h^2$

$$\lim_{h \to 0} \frac{4(-.9+h) - 4.9(-.9+h)^2 - 4(.9) - 4.\ldots}{h}$$

$$\frac{4h + 4.41h - 4.9h^2}{h} \qquad \frac{-3.6 + 4h + 3.969 + 4.41h - 4.9h^2 + 3.6 - 3.969}{h}$$

Double Helix

section 2.1
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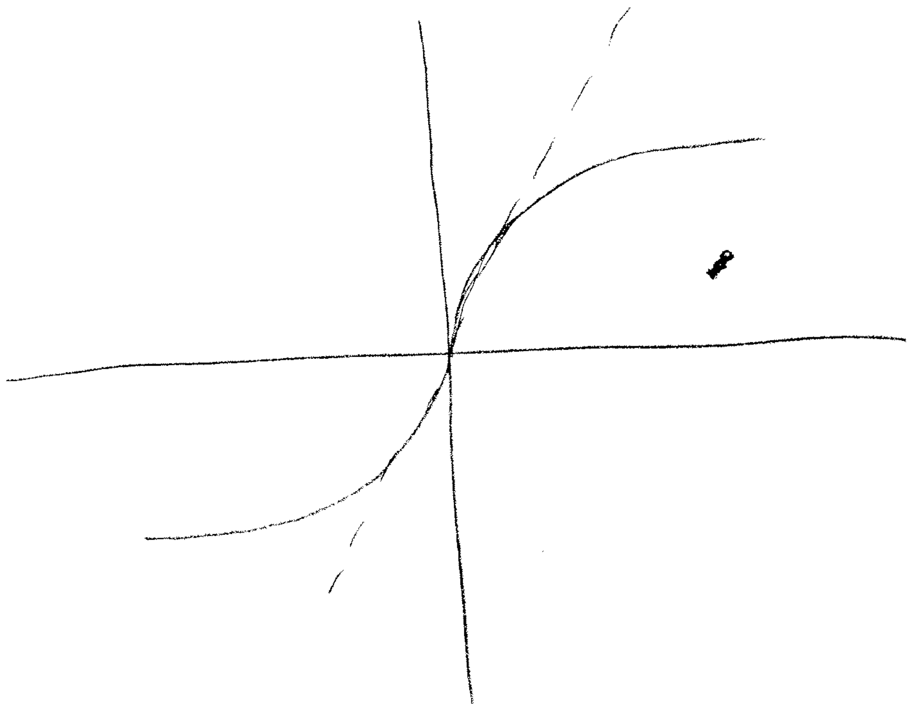


Q= sketch in a plausible tangent
line or say there is no tangent line

$y = \tan^{-1} x$ at $x=0$

Deutsche Produktion - DP

Section 2.2. /6

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

$f'(x) = \lim_{x \to 0} \frac{f(x+h) - f(x)}{h}$

$= \lim_{x \to 0} \frac{[(x+h)^2 - 2(x+h) + 1] - (x^2 - 2x + 1)}{h}$

$= \lim_{h \to 0} \frac{(x^2 + 2xh + h^2) - 2x - 2h + 1 - x^2 + 2x - 1}{h}$

$= \lim_{x \to 0} \frac{2xh - 2h + h^2}{h}$

$= \lim_{x \to 0} \frac{h(2x - 2 + h)}{h}$

$= \lim_{x \to} 2x - 2 + h$

$= \lim_{x \to} 2x - 2 + 0$

$f'(x) = 2x - 2$

INVESTMENT BANKERS

$$f'(x) = \frac{f(x+h) - f(x)}{h}$$

2.2

10) $f(x) = \frac{2}{2x-1}$

$$f(x+h) = \frac{2}{2(x+h)-1}$$

$$= \frac{2}{2x+2h-1}$$

$$f(x+h) - f(x) = \frac{2}{2x+2h-1} - \frac{2}{2x-1}$$

$$= \frac{2(2x-1) - 2(2x+2h-1)}{(2x-1)(2x+2h-1)}$$

$$= \frac{4x - 2 - 4x - 4h + 2}{(2x-1)(2x+2h-1)}$$

$$= \frac{-4h}{(2x-1)(2x+2h-1)}$$

$$\frac{f(x+h) - f(x)}{h} = \frac{\frac{-4h}{(2x-1)(2x+2h-1)}}{h}$$

$$= \frac{-4h}{h(2x-1)(2x+2h-1)}$$

$$= \frac{-4}{(2x-1)(2x+2h-1)}$$

$$\lim_{h \to 0} = \frac{-4}{(2x-1)(2x+2h-1)}$$

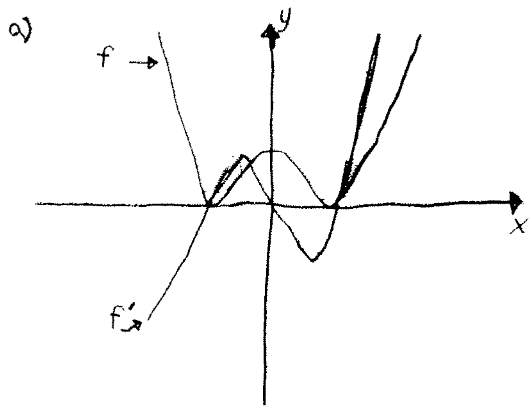
$$f'(x) = \frac{-4}{(2x-1)(2x-1)} = \frac{-4}{(2x-1)^2}$$

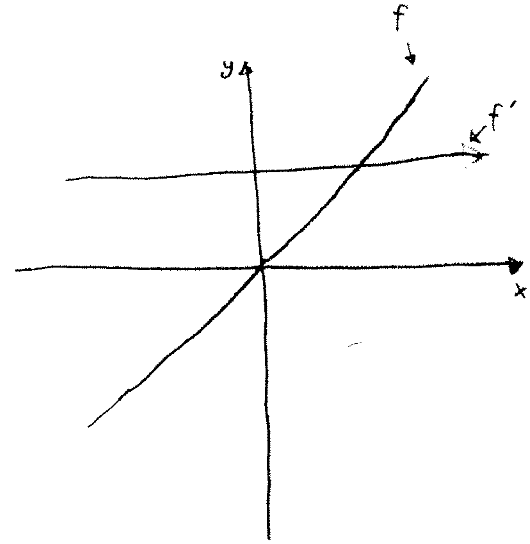
Section 2.2

I.T.

Problem 14

a)





Use the graph of f to Sketch a graph of f'

Grayson Rogers
Ted Condo
Patrick Wells

2.2 # 24 M.A.T-FINISHERS

$f'(2)$ for $f(x) = xe^{x^2}$

STEP ONE

$y = xe^{x^2}$

STEP TWO

2ND, TRACE(CALC), ↓, 6 (Dy, Dx), ENTER

STEP THREE

MAKE SURE STANDARD GRAPH.

STEP FOUR

TRACE, X = 2, ENTER

y = ~~109.1963~~

dy dx = 491.38544

Mo Williams Hiroaki Tominaga, Julian Ward

PURPLE PARROTS

2.2 # 28

t	1.7	1.8	1.9	2	2.1	2.2	2.3
f(t)	4.6	5.3	6.	7.0	7.8	8.6	9.3

$$\frac{7-6.1}{2-1.9} = \frac{.9}{.1} = 9$$

$$\frac{7.8-7}{2.1-2} = \frac{.8}{.1} = 8$$

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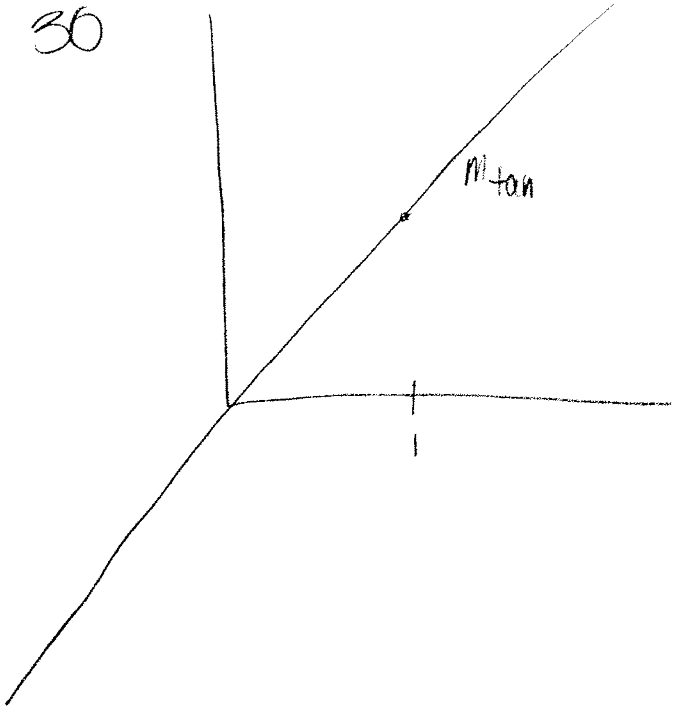


$y = x$ at $x = 1$

at $x=1$ find the tangent.

timothy zukowicz
Abraham Sherman

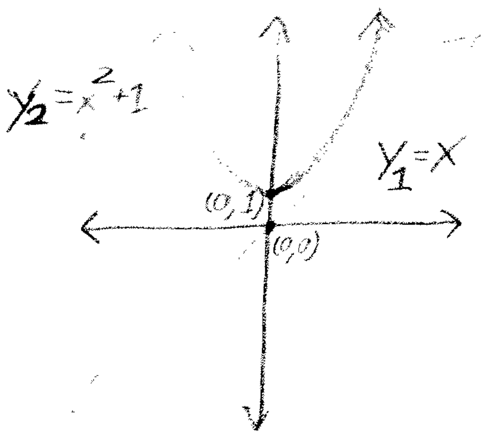
section 1.5

36)

a) $Y_1 = X$

$Y_2 = X^2 + 1$

graph Y_1 and Y_2



$Y_1 = X$ and $Y_2 = X^2 + 1$ do not intersect

b) $Y_1 = X$

$Y_2 = X^2 + 1$

for what X $\frac{dy_1}{dx} = \frac{dy_2}{dx}$?

$$\frac{dy}{dx} = \frac{y_1(x+h) - y_1(x)}{h}$$

$$\frac{dy_1}{dx} = \frac{(x+h) - (x)}{h}$$

$$\frac{dy_1}{dx} = h/h = 1$$

$$\frac{dy_2}{dx} = \frac{[(x+h)^2 + 1] - (x^2 + 1)}{h}$$

$$\frac{dy_2}{dx} = \frac{(x^2 + 2xh + h^2 + 1) - (x^2 + 1)}{h}$$

$$\frac{dy_2}{dx} = \frac{2xh + h^2}{h} \rightarrow 2x + h$$

$$\lim_{h \to 0} = 2x$$

$2x = 1$ when $x = 1/2$