2.7
#11

#5

CLARK

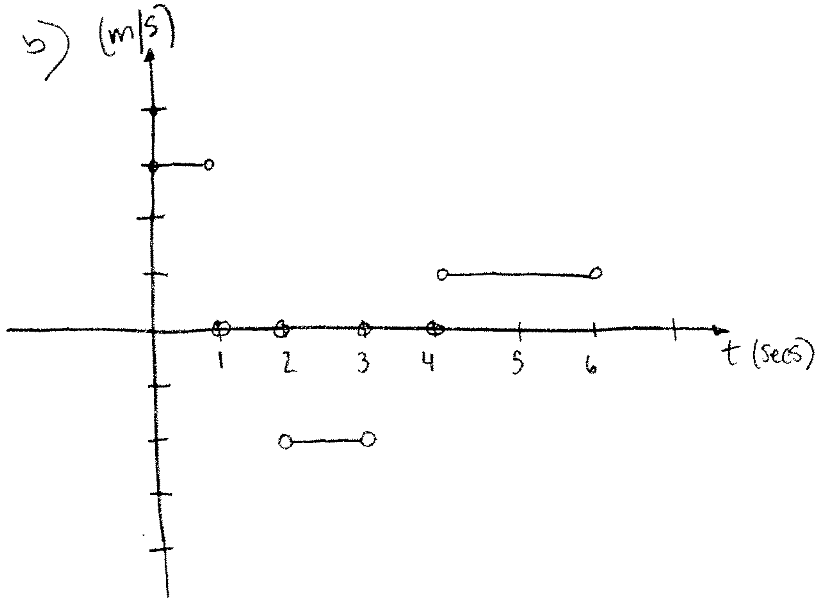
2.7 #11

a) $0 < t < 1$ & $4 < t < 6$ moving right

$1 < t < 2$ & $3 < t < 4$ standing still

$2 < t < 3$ moving left

b)



2.7 #14

Connor Payne, Stanley Tuchez, Tyler Ferst

Section 2.7

(14) If a rock is thrown upward on the planet mars with a velocity of 10 m/s, its height (in meters) after t seconds is given by $H = 10t - 1.86t^2$

(a) Find the velocity of the rock after one second?

graph: $10x - 1.86x^2$ $\boxed{2nd}$ Calc: dy/dx Enter $= 6.28$

or

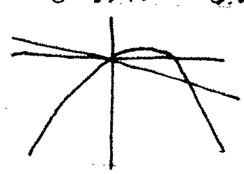
$10x - 1.86x^2$ a velocity after 1 second $10 - 3.72 = 6.28$

$y' = 10 - 1.86(2t)$ graph deriv. Zoom: 0

$= 10 - 3.72t$

$Y_1 = 10x - 1.86x^2$

$\boxed{Math}$: 8 → $Y_2 = $ nDeriv (Y_1, X, X)



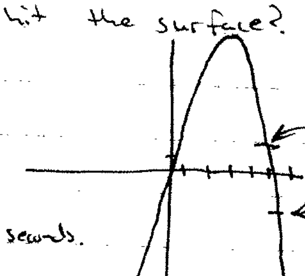
(b) Find the velocity of the Rock when t=a.

$10(6.28) - 1.86(6.28^2)$

$= -10.56$

(c) When will the rock hit the surface?

$Y_1 = 10x - 1.86x^2$ $\boxed{graph}$



$\boxed{2nd}$ Calc: Zero left bound? Right bound? Guess?

$X = 5.3763441$ $Y = 0$

The rock will hit the surface at aprox. 5.38 seconds.

(d) With what velocity will the rock hit the surface?

$\boxed{2nd}$ Calc: 6 Dy/Dx, 5.38 $\boxed{Enter}$ $= -10.0136$

(2.7 #14)

L.W.V

Letrice
Wilgens
Viviene

02/15/10.

2.7
14.

$$H(t) = 10t - 1.86t^2$$

$$H'(t) = 10 - 2(1.86)t$$

$$= 10 - 3.72t$$

a) $t=1$ $H'(1) = 10 - 3.72(1)$

$$= 10 - 3.72$$

$$= \underline{6.28 \text{ m/s}}$$

b) $t = a$

$$H'(a) = 10 - 3.72(a)$$

$$= 10 - 3.72a$$

c) $H = 10t - 1.86t^2$

$$0 = 10t - 1.86t^2$$

$$t(10 - 1.86t)$$

$$t = 0.$$

$$10 - 1.86t = 0.$$

$$\frac{\cancel{+1.86}t}{\cancel{+1.86}} = \frac{-10}{-1.86}$$

$$t = 5.376$$

$$t = 5.38 \text{ m/s}$$

d) the velocity is the same as the starting velocity which is 10 m/s.

2.7 #26

2.7 TEAM: C.A.M.

#26) $f(a) = a^4 - 5a$

$(a+h)(a^2 + 2ah + h^2)$
$(h+h)(a^3 + 3a^2h + 3ah^2 + h^3)$

$$\begin{array}{r} a+h \\ \hline a^4 + 3a^3h + 3a^2h^2 + ah^3 \\ a^3h + 3a^2h^2 + 3ah^3 + h^4 \\ \hline a^4 + 4a^3h + 6a^2h^2 + 4ah^3 + h^4 - 5(a+h) \end{array}$$

$$= \cancel{a}^4 + 4a^3h + 6a^2h^2 + 4ah^3 + h^4 - 5\cancel{a} - 5h$$

$$f(a+h) - f(a) = -\cancel{a}^4 \qquad -\cancel{5}a$$

$$\frac{f(a+h)-f(a)}{h} = \frac{h}{h}(4a^3 + 6a^2h + 4ah^2 + h^3 - 5)$$

$$\lim_{h \to 0} \frac{f(a+h)-f(a)}{h} = 4a^3 - 5$$

Augustin Ciscolison

CASANDRA LUCERO

2.7 #26

Ryan Zhato
Will Arbito

B.A is B.S

26. $f(t) = t^4 - 5t$

$$\lim_{h \to 0} \frac{f(t+h) - f(t)}{h}$$

$$\lim_{h \to 0} \frac{(t+h)^4 - 5(t+h) - (t^4 - 5t)}{h}$$

$$\lim_{h \to 0} \frac{6t^2h^2 + 4t^3h + 4th^3 + h^4 + \cancel{5t} - \cancel{5t} - 5h}{h}$$

$$\lim_{h \to 0} \frac{h(6t^2h + 4t^3 + 4th^2 - h^2 - 5)}{h}$$

$$= 4t^3 - 5$$

2.7
#41

~~Pythagorous~~
Pythagorous

41.

Year	1998	1999	2000	2001	2002	2003
P	28	39	55	68	77	83

a(i) from 2000 to 2002 (ii) from 2000 to 2001

A (2000, 55) B(2002, 77) A(2000, 55) B(2001, 68)

slope AB = $\frac{77-55}{2002-200} = \frac{22}{2} = 11\%/yr$ slope AB = $\frac{68-55}{2001-200} = \frac{13}{} = 13\% / year$

(iii) from 1999 to 2000 A(1999, 39) B(2000, 55)

slope AB = $\frac{55-39}{2000-1999} = \frac{16}{1}$

$= 16\%/year$

(b) Using (ii) and (iii) $\frac{16+13}{2} = 14.5\% /year$.

(c) Estimate A as (1999, 40)
B as (2001, 70)

slope AB = $\frac{70-40}{2001-1999} = \frac{30}{2} = 15\%$ year.

Mike
Ioan
Vinh

2.7-47

t	0	2	4	6	8	10	12	14
T	73	73	70	69	72	81	88	91

- $T'(10)$ means the rate at which temperature is changing at 10:00 AM.

- Estimate:

Ave rate of change from 8 - 10

$$\frac{\Delta y}{\Delta x} = \frac{81-72}{10-8} = \frac{9}{2} = 4.5 \text{ F degree per hours}$$

Ave rate of change from 10 - 12

$$\frac{\Delta y}{\Delta x} = \frac{88-81}{12-10} = \frac{7}{2} = 3.5 \text{ F degree per hours}$$

Instantaneous rate of change at 10:00 AM

$$T'(10) = \frac{4.5+3.5}{2} = 4 \text{ F degree per hour}$$

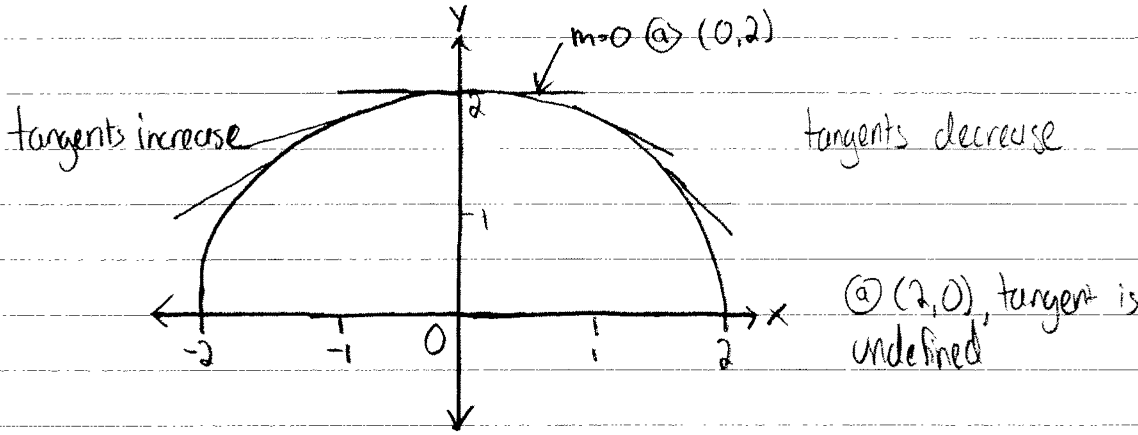
2.8 #7

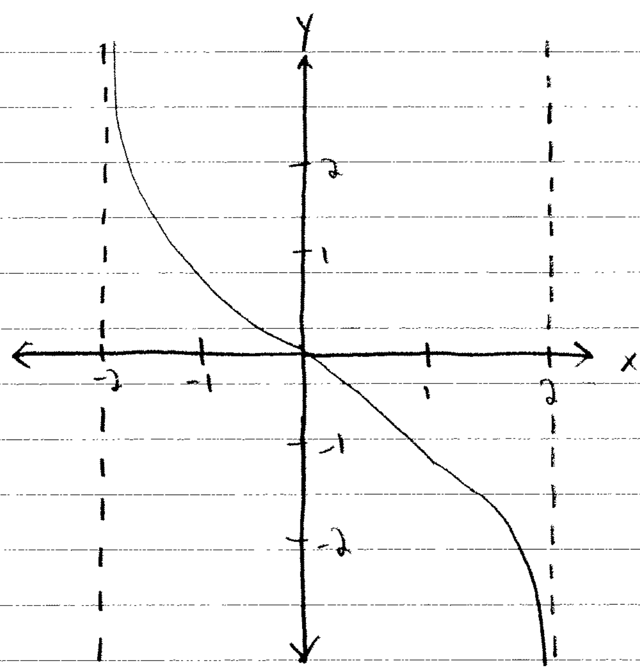
Kristian Feher

Save the Polar Bears

Mat: 151

2.8 #7.



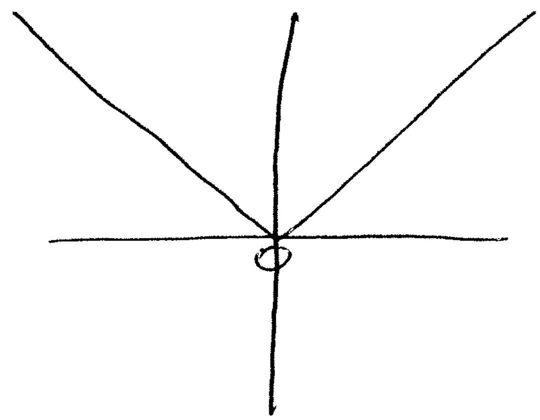


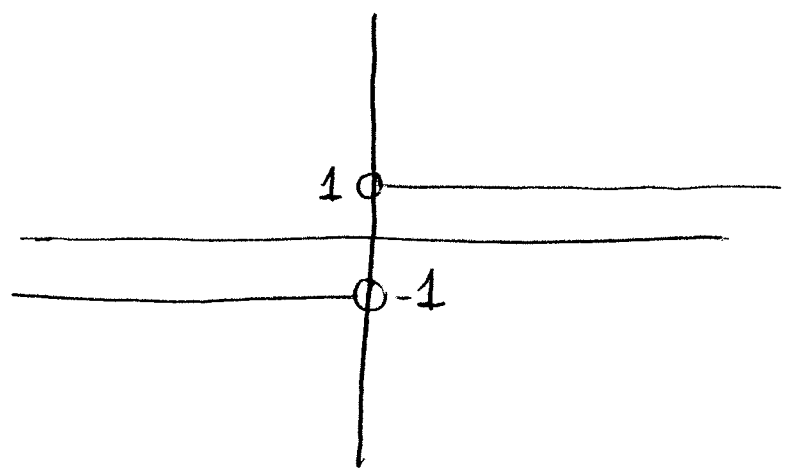
2.8
#8

Science Buddies + Kickass

$f(x) = |x|$

$f'(x) = y$





it doesn't exist on "0".

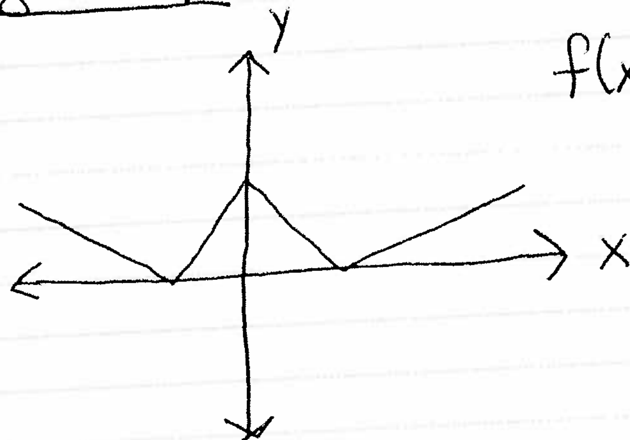
2.8
#9

We Love Math

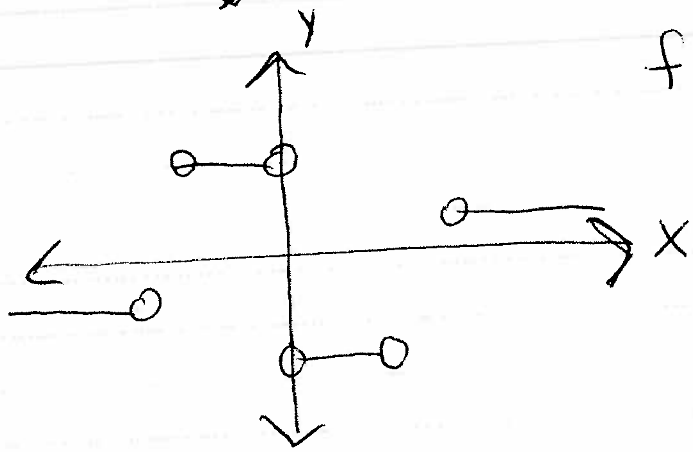
Krystina
Stefania
Jessica

2.8 #9

f(x)



f'(x)

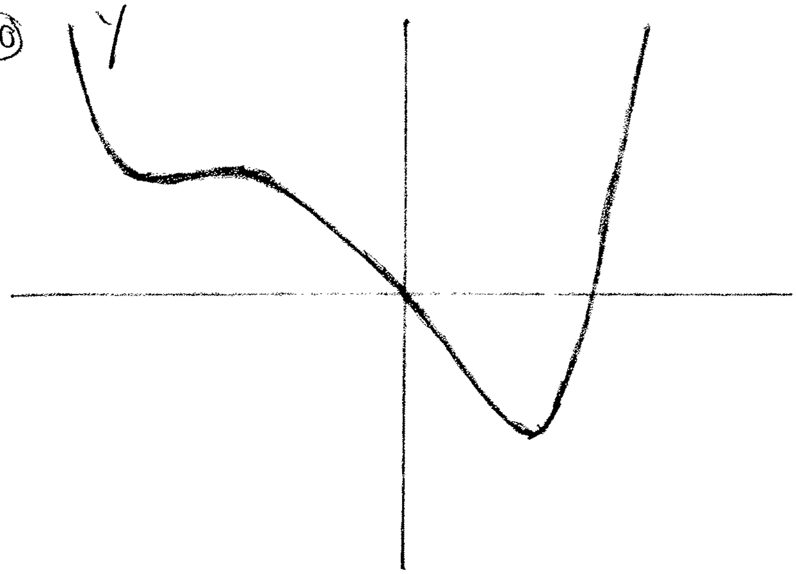


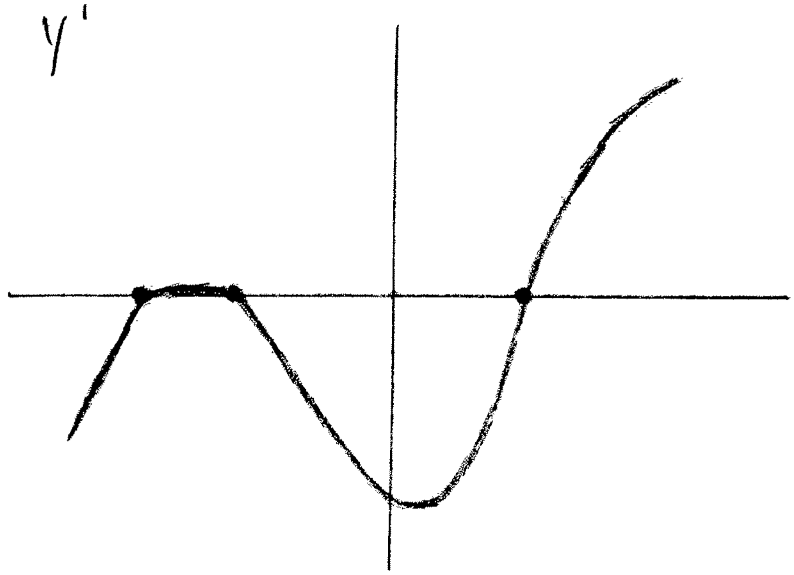
2.8
#10

THE GROUP

Yves Mosoula
Abe Eapen

10

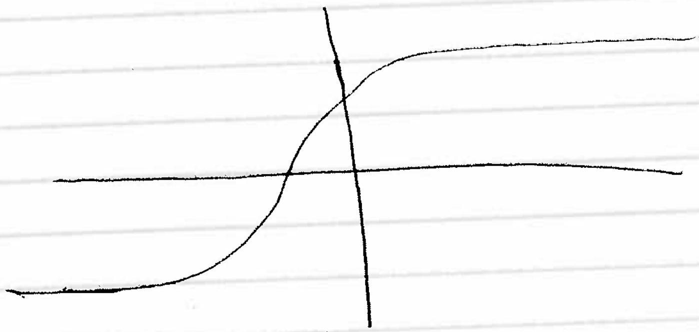




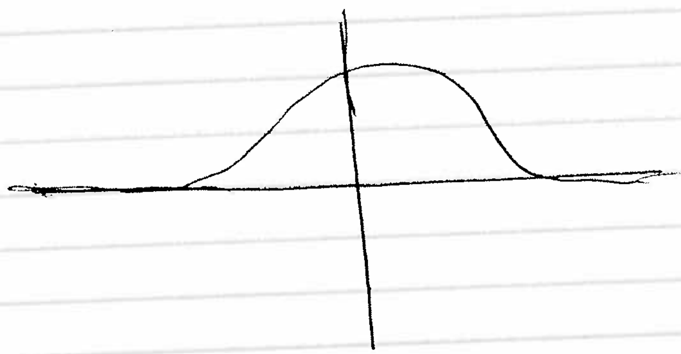
2.8
#1

2.8
#11

f(a)



f'(a)



2.8 #45

MAT151... Team: α
HW: (2.8) #45

2/8/10
Mike Gankhuyang
Guan Zheng
Jonathan Chen

✓ 45.) $f(x) = 1 + 4x - x^2$

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

$$\left.\begin{array}{l} f(x+h) = -(x+h)^2 + 4(x+h) + 1 \\ f(x) = 1 + 4x - x^2 \end{array}\right\} = \frac{f(x+h) - f(x)}{h}$$

$$= [-(x+h)^2 + 4(x+h) + 1] - [1 + 4x - x^2]$$

$$= \cancel{-x^2} - 2xh + h^2 \cancel{+4x} + 4h \cancel{+1} \cancel{-1} \cancel{-4x} \cancel{+x^2}$$

$$= -2xh + 4h - h^2 \Rightarrow h(-2x + 4 - h)$$

$$\lim_{h\to 0} \frac{f(x+h) - f(x)}{h} = \frac{\cancel{h}(-2x - h + 4)}{\cancel{h}} = \lim_{h\to 0} -2x - h + 4 = \begin{cases} x = 0 \\ f'(0) = 4 \end{cases}$$

$$\to -2x + 4$$ ✓

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

$$\left.\begin{array}{l} f'(x+h) = -2(x+h) + 4 \\ f'(x) = -2x + 4 \end{array}\right\} = \frac{f'(x+h) - f'(x)}{h}$$

$$= [-2(x+h) + 4] - [-2x + 4] = \cancel{-2x} - 2h + 4 \cancel{+2x} - 4$$

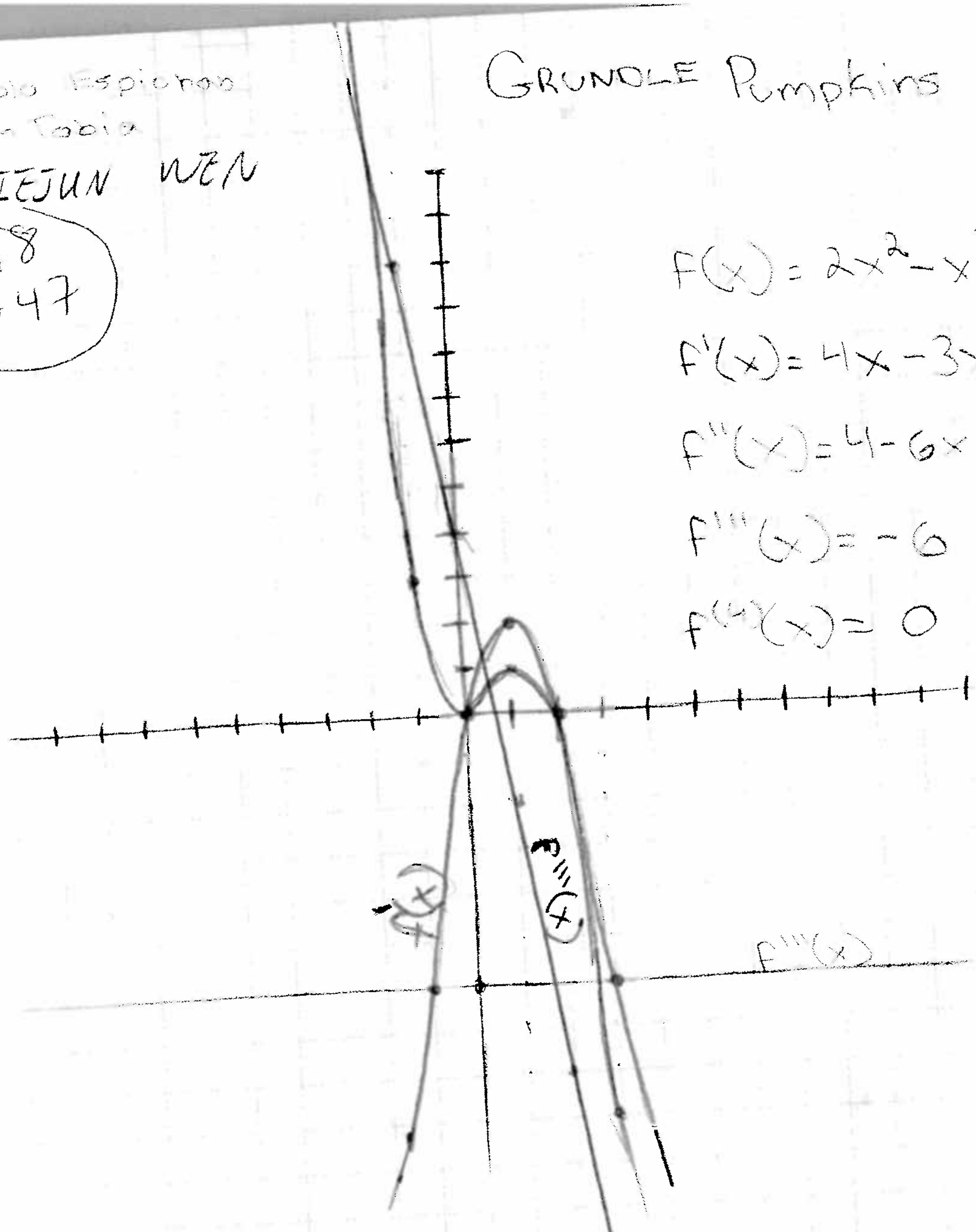
$$\Rightarrow -2h$$

$$\lim_{h\to 0} \frac{f'(x+h) - f'(x)}{h} = \frac{\cancel{h}(-2)}{\cancel{h}} \Rightarrow \lim_{h\to 0} (-2) \Rightarrow f''(x) = -2$$ ✓

Pablo Espinoza
Sam Tobia
TIEJUN WEN

2.8
#47

GRUNDLE Pumpkins



$f(x) = 2x^2 - x^3$

$f'(x) = 4x - 3x^2$

$f''(x) = 4 - 6x$

$f'''(x) = -6$

$f^{(4)}(x) = 0$

$$f'(x) = \lim_{h \to 0} \frac{2(x+h)^2 - (x+h)^3 - (2x^2 - x^3)}{h} = \frac{\cancel{2x^2} + 4xh + 2h^2 - \cancel{x^3} - h^3 - 3x^2h - 3xh^2 - \cancel{2x^2} + \cancel{x^3}}{h}$$

$$= \lim_{h \to 0} 4x + 2h - h^2 - 3x^2 - 3xh$$

$$f'(x) = 4x - 3x^2$$

$$f''(x) = \lim_{h \to 0} \frac{4(x+h) - 3(x+h)^2 - (4x - 3x^2)}{h}$$

$$= \lim_{h \to 0} \frac{\cancel{4x} + 4h - \cancel{3x^2} - 6xh - 3h^2 - \cancel{4x} + \cancel{3x^2}}{\cancel{h}}$$

$$4 - 6x - 3h$$

$$4 - 6x$$

$$f'''(x) = \frac{4 - 6(x+h) - (4 - 6x)}{h}$$

$$= \frac{\cancel{4} - \cancel{6x} - 6h - \cancel{4} + \cancel{6x}}{h}$$

$$= \frac{-6h}{h} = -6$$

$$f^{(4)}(x) = 0$$