

# Polynomials

- Degree + Leading Coeff.



Number of Zeros

Distinct  
Repeated

Complex (Pairs)



END Behavior

Disco vs. Parab.

Left  
Right

Happy  
Sad

## Data



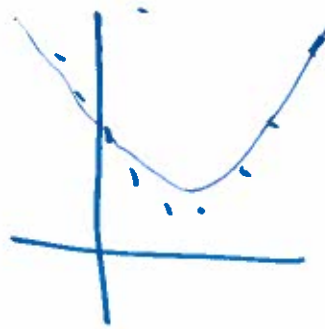
Linear

Degree: 1

Lead: ⊕

Disco  
Right

Zeros: 1 real

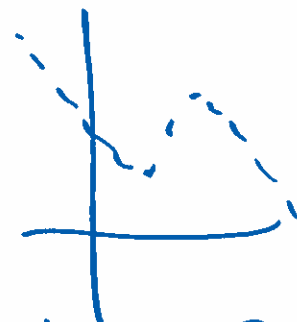


Degree: 2

Lead: ⊕

Happy  
Parabola

2 complex

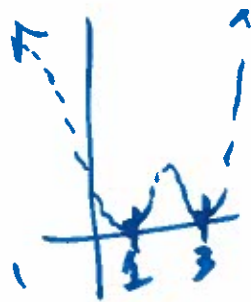


Degree: 3

Lead: ⊖

Disco  
Left

1 real  
2 complex



Degree: 3

Lead: ⊕

4 real  
repeats.  
1, 1, 3, 3

$(x-1)^2(x-3)^2$

# Rational Functions

$$\frac{P(x)}{Q(x)} \quad \begin{array}{l} \text{DN, ZN, LN} \\ \text{DD, ZD, LD} \end{array}$$

Degree  
zeros  
Lead

Zeros of  $\frac{P(x)}{Q(x)} = \text{ZN}$

- Passing Thru
- Touching

Vertical Asymptotes = ZD

- Heartbeat
- Volcano

END BEHAVIOR

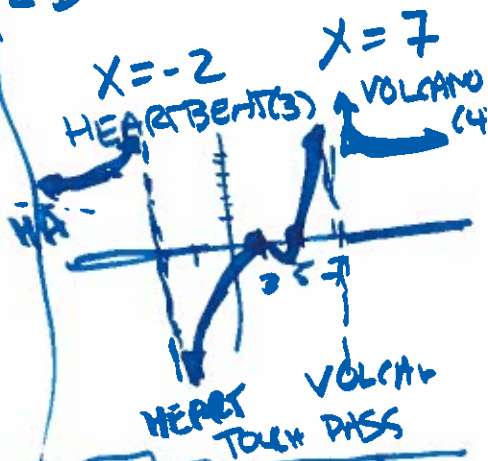
DD > DN      HA  $y=0$   
 ↑  
 Horizontal Asymptote

Ex  $y = \frac{1}{x}$



$$\frac{6(x-3)^2(x-5)^5}{1(x+2)^3(x-7)^4}$$

ZN 3, 3      PASS 5, 5, 5, 5, 5  
 ZD -2      7



DD < DN

Ex  $y = \frac{x^2+1}{x}$

No HA.  
 Slant Asymptote

DR = DN - DD  
 $2 - 1 = 1$   
ODD

LR =  $\frac{LN}{LD} = \frac{1}{1}$   
Pos.

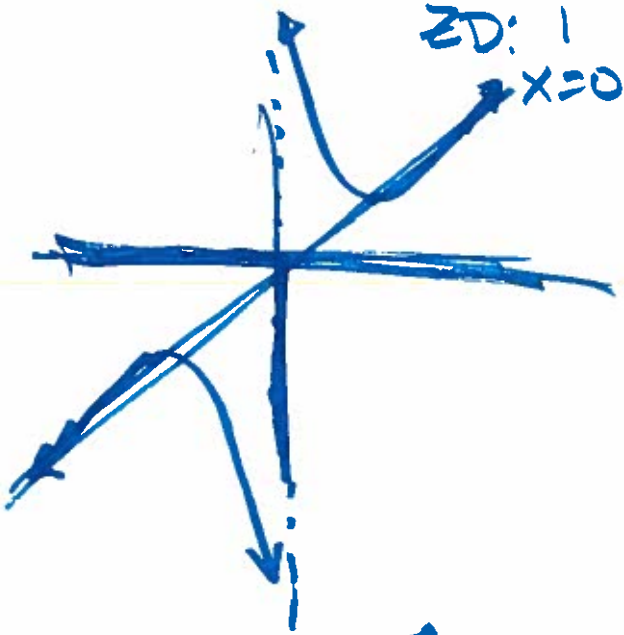
POSITIVE  
 ODD

DISJO  
 RIGHT

DD = DN

HA =  $\frac{LN}{LD} = \frac{6}{1}$

$$y = \frac{x^2 + 1}{x}$$



$$ZN: 2 \text{ complex } x^2 + 1 = 0$$

$$x^2 = -1$$

$$i, -i$$

$$(x^2 + 1)$$

$$(x - i)(x + i)$$

$$x = \pm \sqrt{-1} = \pm i$$

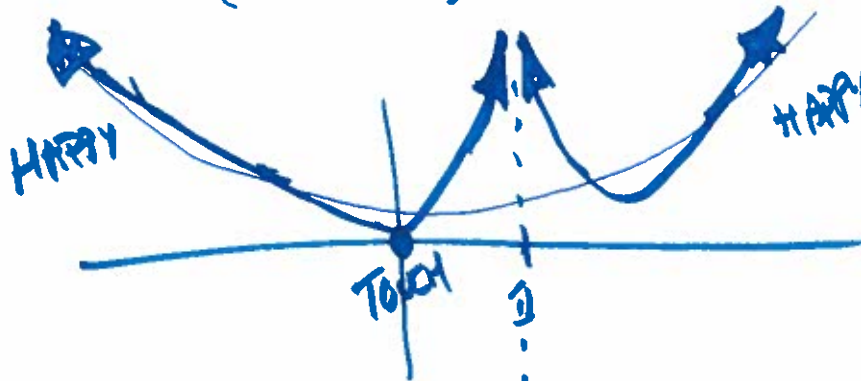
EX

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

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

TOUCH  
ZN: 0,0,0,0

ZD: 1,1  
VOLCANO



HAPPY ENDS?

$$DR = 4 - 2 = 2$$

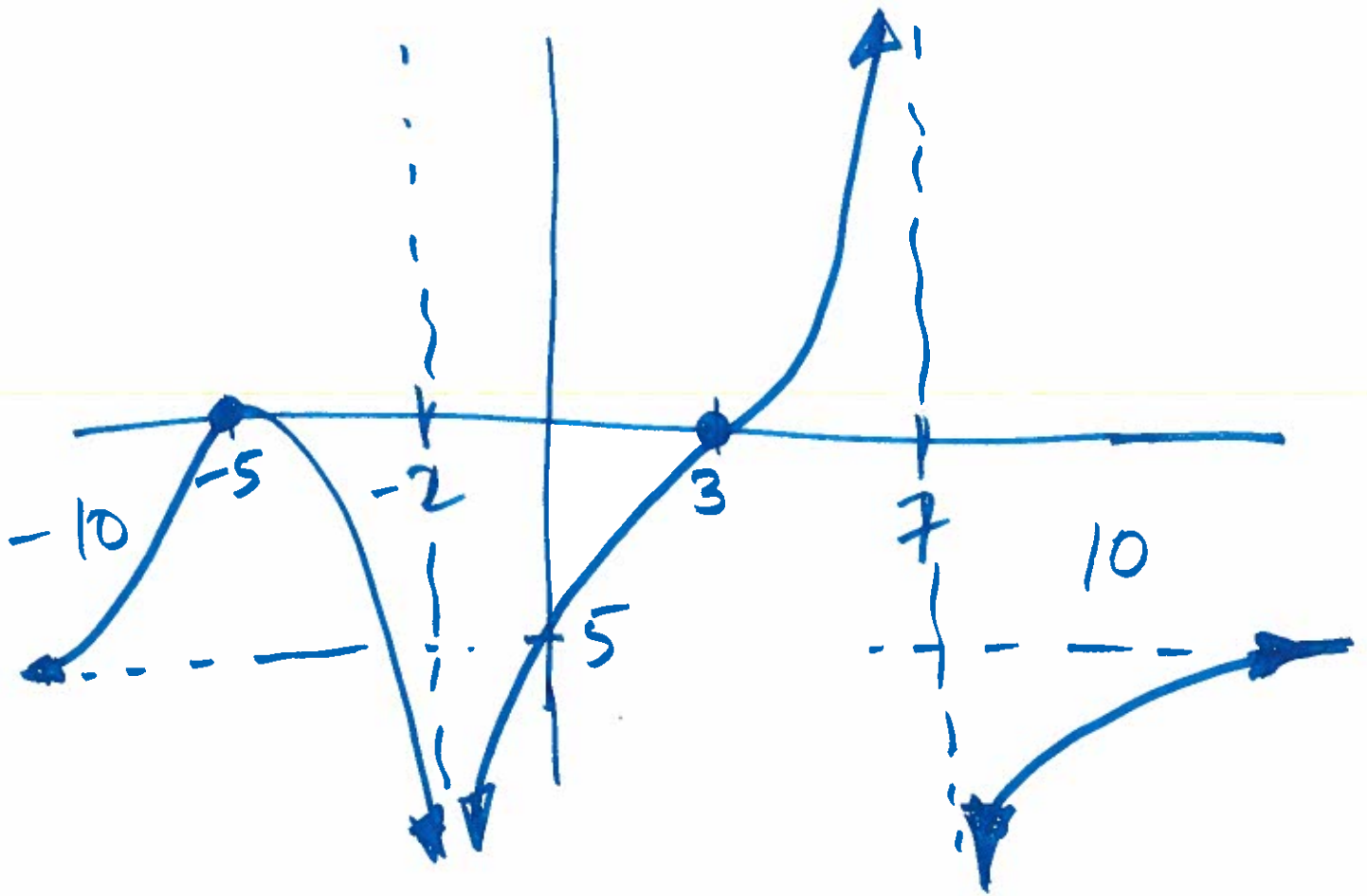
EVEN

$$LR = \frac{1}{1} \text{ POS}$$

EVEN POSITIVE  
= HAPPY

Has NO  
VA.

Slant Asymptote  
L:  $y = x^2$



Horizontal Asymptote

$$DN = DD$$

$$y = -5$$

$$\frac{LN}{LD} = \frac{-5}{1}$$

Zeros

$$ZN = -5, 3$$

TOUCHING  
EVEN #

PASSING  
ODD.

2

1

Num Factor  $(x+5)^2(x-3)^1$

ZD:

-2  
VOLCANO  
 $(x+2)^2$

7  
HEAVY  
 $(x-7)^1$

Denom Factors

$$\frac{-5(x+5)^2(x-3)^1}{1(x+2)^2(x-7)^1}$$

GROUP NAME:

Student Names (First and Last)

Date: \_\_\_\_\_

Speaker/Presenter: Bailey Martinez

Independent Variable (x-axis): \_\_\_\_\_

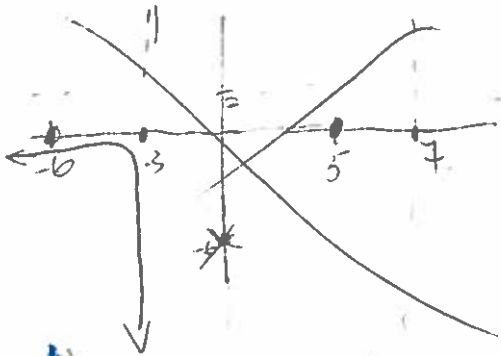
Writer/Prep: Li-Yang Lin

Dependant Variable (y-axis): \_\_\_\_\_

Leader/Collaborator: \_\_\_\_\_

Conclusion (in words):

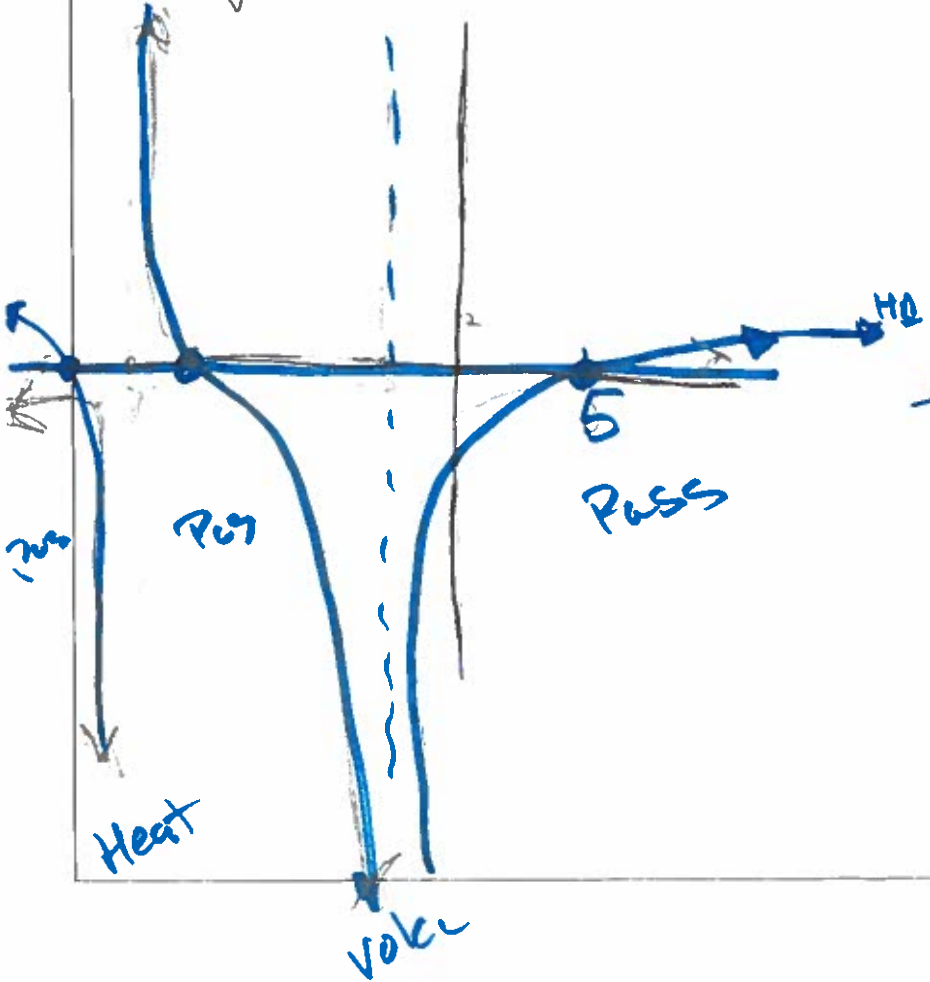
Supporting Work:



$$\frac{2(x+6)(x-5)}{1(x+3)^2(x+7)}$$

zero = -6, 5  
 zero = -3, -7  
 vertical = -3, -7  
 HA = 2

$$\frac{2(x-5)(x+6)(x+9)}{1(x+3)^2(x+7)}$$



GROUP NAME: Math LOVERS

Date: 2/18/14

Student Names (First and Last)

Speaker/Presenter: Osman

Writer/Prep: Karthik

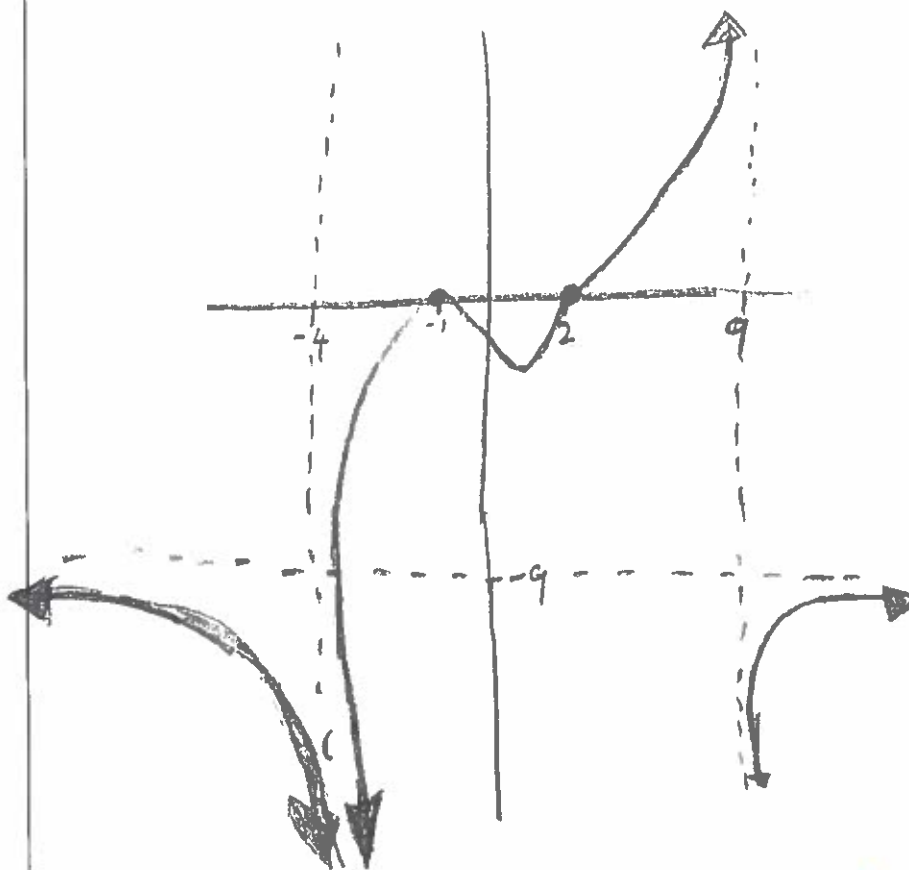
Leader/Collaborator: Xloov

Independent Variable (x-axis): \_\_\_\_\_

Dependant Variable (y-axis): \_\_\_\_\_

Conclusion (in words):

Supporting Work:



$$Z_N = -1, 2$$

Numer factor =  $-9(x+1)^2(x-2)$

Touching  
odd  
-1

Passing  
even  
2

$$Z_D = -4, 9$$

Denom factors  $(x+4)(x-9)$

$$y = \frac{-9(x+1)^2(x-2)}{1(x+4)^2(x-9)}$$

$$LN = \frac{-9}{1}$$

GROUP NAME: Team 3.

Student Names (First and Last)

Date: 2/18

Speaker/Presenter: Bergain Fidesio

Independent Variable (x-axis): \_\_\_\_\_

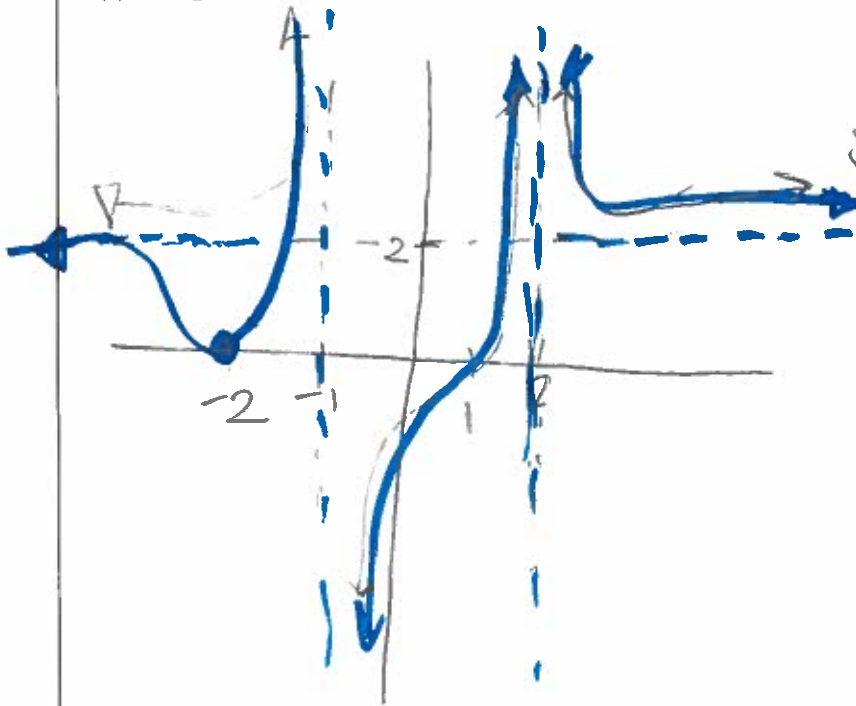
Writer/Prep: Kevin Florentino

Dependant Variable (y-axis): \_\_\_\_\_

Leader/Collaborator: \_\_\_\_\_

Conclusion (in words):

Supporting Work:



Z.N: -2

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

DN	3
DD	3
LN	2
LD	1
Z.N	-2, 1
Z.D	-1, 2

Z.N -2 repeated twice (touch)  
 Z.D 2 repeated twice (vertical)

Jedi

GROUP NAME:

Student Names (First and Last)

Date: 18 Feb 2014

Speaker/Presenter: Paul Klos

Independent Variable (x-axis): \_\_\_\_\_

Writer/Prep: Ricky Wilson

Dependant Variable (y-axis): \_\_\_\_\_

Leader/Collaborator: Paul / Ricky

Conclusion (in words):

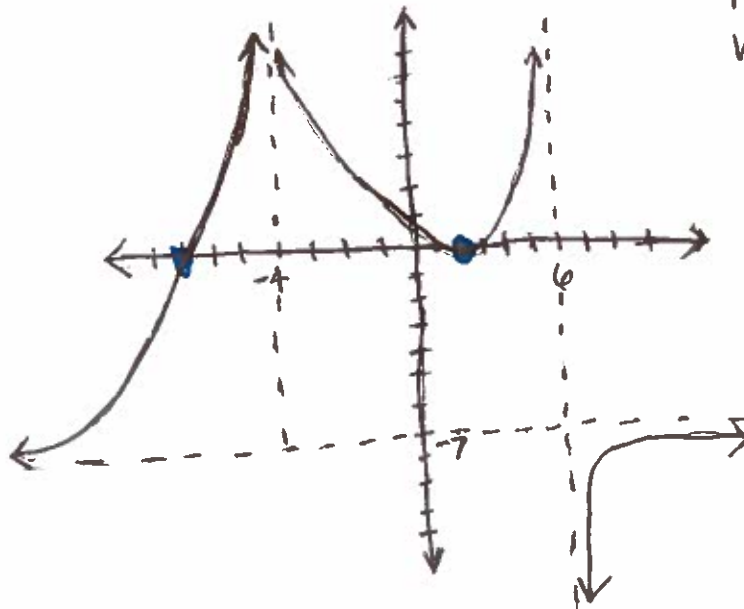
Supporting Work:

DD = DN

ZEROS -7, 1, 3

HA: -7

VA: -4, 6



$$\frac{-7(x+7)(x-1)(x-3)}{(x+4)^2(x-6)^2}$$



GROUP NAME: This Group, Best Group

Student Names (First and Last)

Date: 2/18/14

Speaker/Presenter: Jose Johnson

Independent Variable (x-axis): \_\_\_\_\_

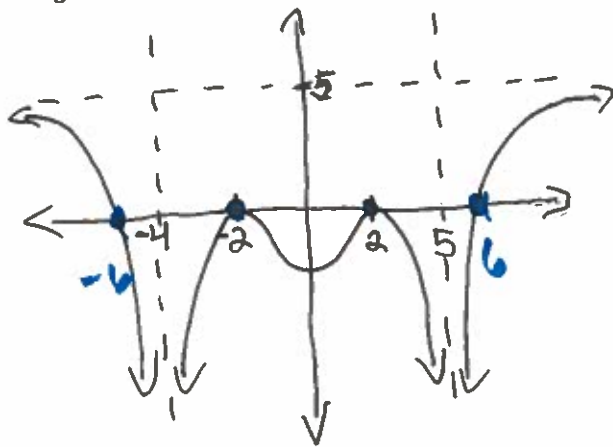
Writer/Prep: Philip Lopez

Dependant Variable (y-axis): \_\_\_\_\_

Leader/Collaborator: Stephen Burns

Conclusion (in words):

Supporting Work:



Zeroes -2, 2 touches, repeating (even degree)

Vertical Asymptotes -4, 5 volcanoes (even degree)

$$f(x) = \frac{-5(x-2)^2(x+2)^2(x+6)(x-6)}{1(x+4)^2(x-5)^2}$$

GROUP NAME: Money Bags

Date: 2/18

Student Names (First and Last)

Speaker/Presenter: Melissa Scarpati

Writer/Prep: Amelica Ippolito

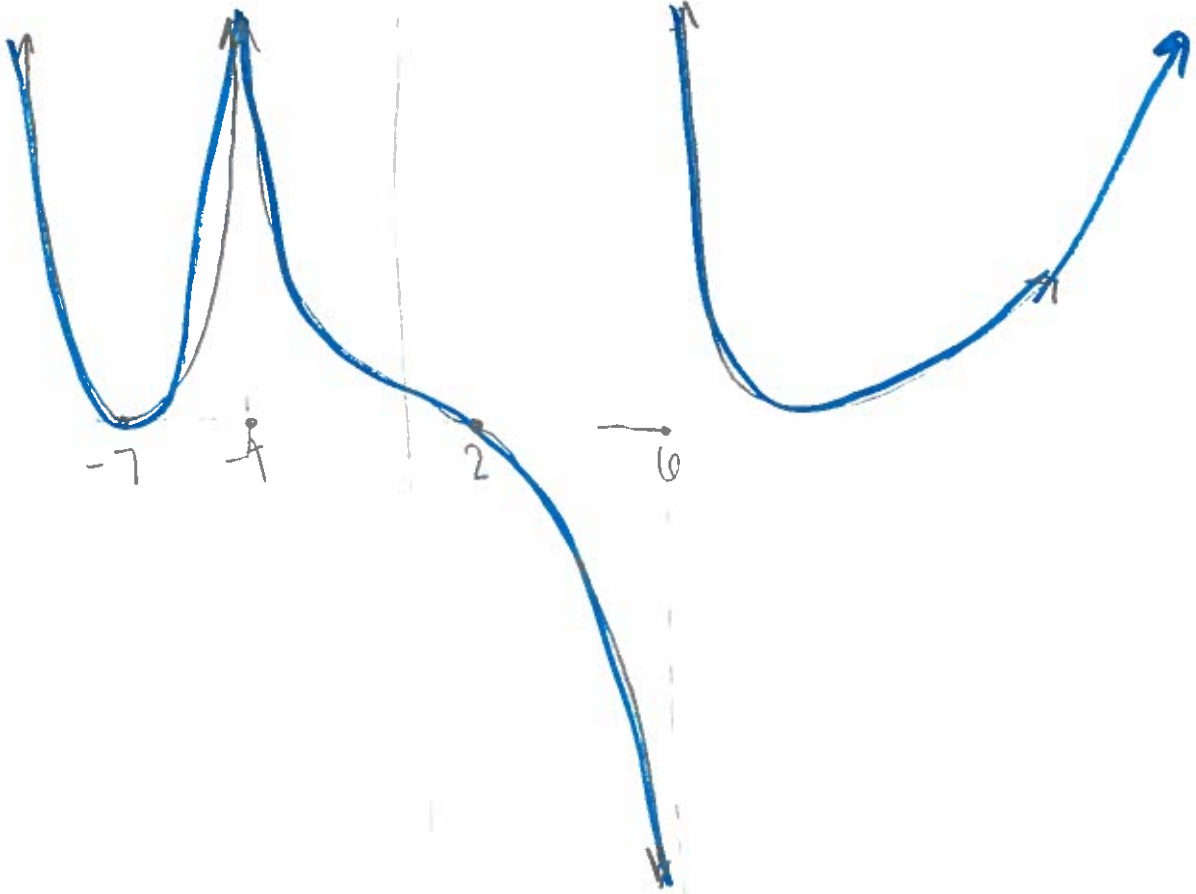
Leader/Collaborator: Kevin Enrighetto

Independent Variable (x-axis): \_\_\_\_\_

Dependant Variable (y-axis): \_\_\_\_\_

Conclusion (in words):

Supporting Work:



zn: -7, 2

zd: -4, 6

n-factors:  $(x+1)^4(x-2)$

d-factors:  $(x+4)^2(x-6)$

$$f(x) = + (x+7)^4 (x-2) + (x+4)^2 (x-6)$$

LR =  $\frac{L0}{L0} = \frac{1}{1}$

DN = 5  
DD = 3  
DR = 5-3 = 2

GROUP NAME:

Student Names (First and Last)

Date: \_\_\_\_\_

Speaker/Presenter: Christian Guerra

Independent Variable (x-axis): \_\_\_\_\_

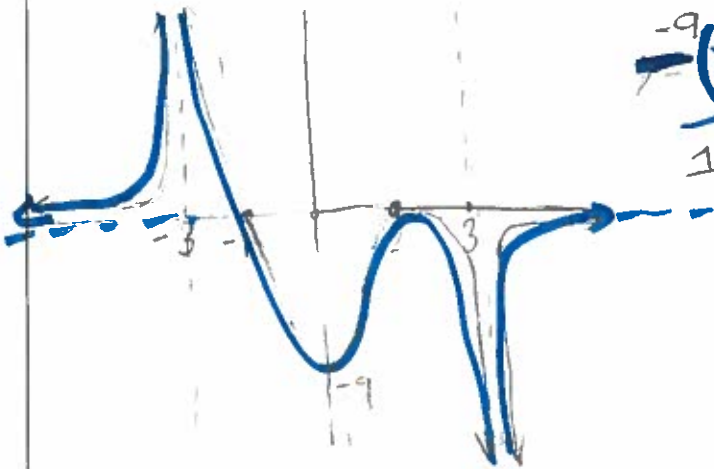
Writer/Prep: Clifford E. ...

Dependant Variable (y-axis): \_\_\_\_\_

Leader/Collaborator: J. Amparis

Conclusion (in words):

Supporting Work:



DD > DN

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

- No Horizontal
- Slant asymptote

$$f(0) = \frac{-(-2)^2(1)^1}{(-3)^2(3)^2} = \textcircled{+}$$

GROUP NAME: We love math

Date: 4/18

Independent Variable (x-axis): \_\_\_\_\_

Dependant Variable (y-axis): \_\_\_\_\_

Student Names (First and Last)

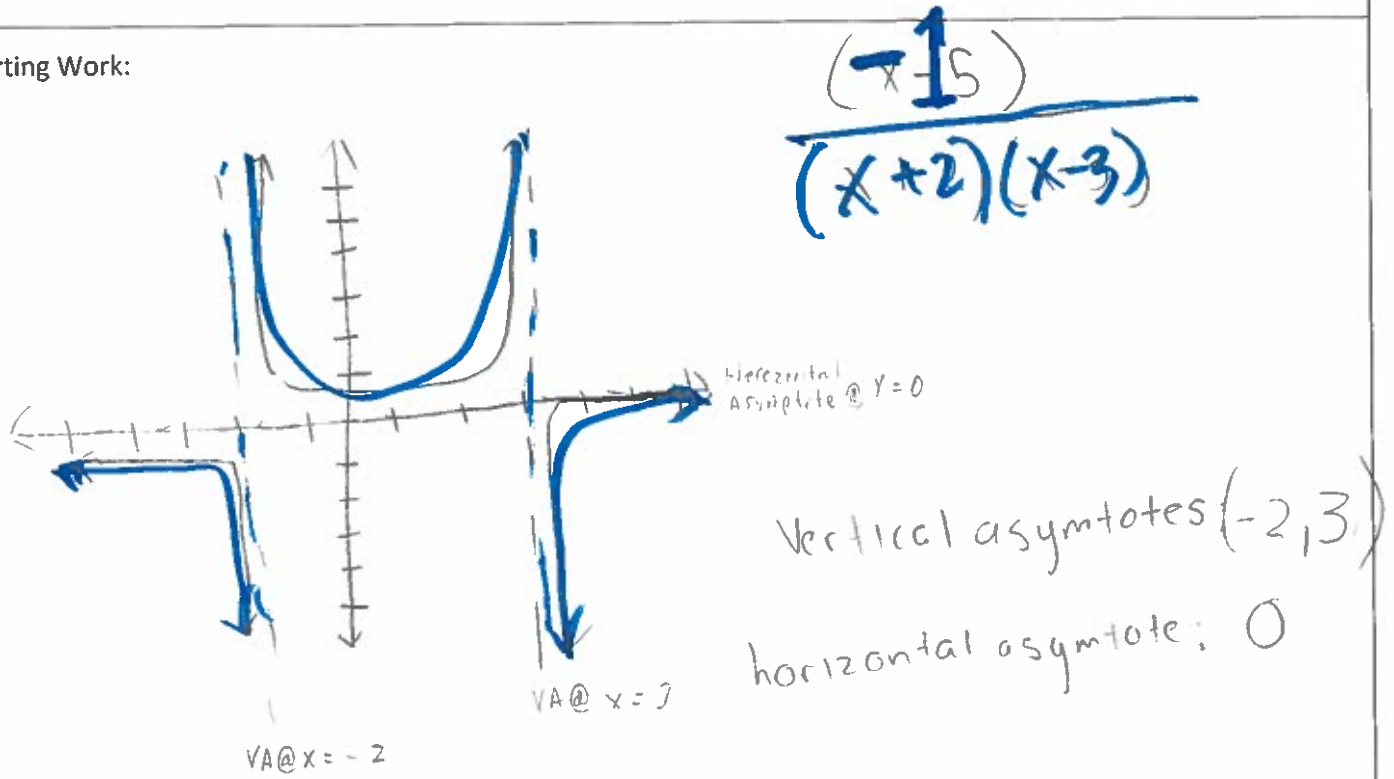
Speaker/Presenter: Craig S.

Writer/Prep: Victor F

Leader/Collaborator: Zach L.  
Joey Stevens

Conclusion (in words):

Supporting Work:



GROUP NAME: love science

Date: 02/18/13

Student Names (First and Last)

Speaker/Presenter: Yvette Aguilar

Writer/Prep: Marta Truszkewicz

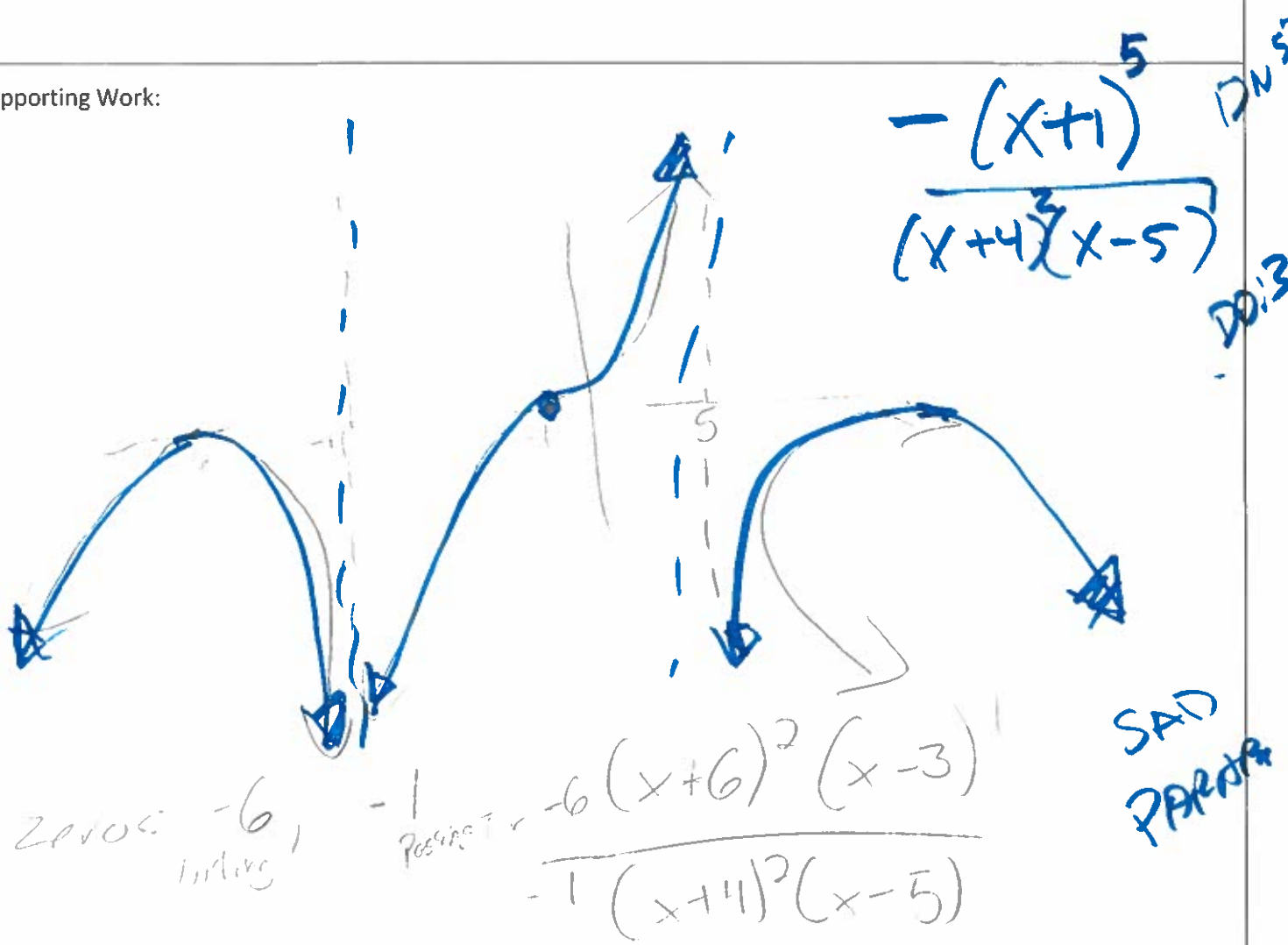
Leader/Collaborator: LOVE KENNETH

Independent Variable (x-axis): \_\_\_\_\_

Dependant Variable (y-axis): \_\_\_\_\_

Conclusion (in words):

Supporting Work:



GROUP NAME: Pre Calc Invaders

Student Names (First and Last)

Date: 2/18/14

Speaker/Presenter: [unclear]

Independent Variable (x-axis): x

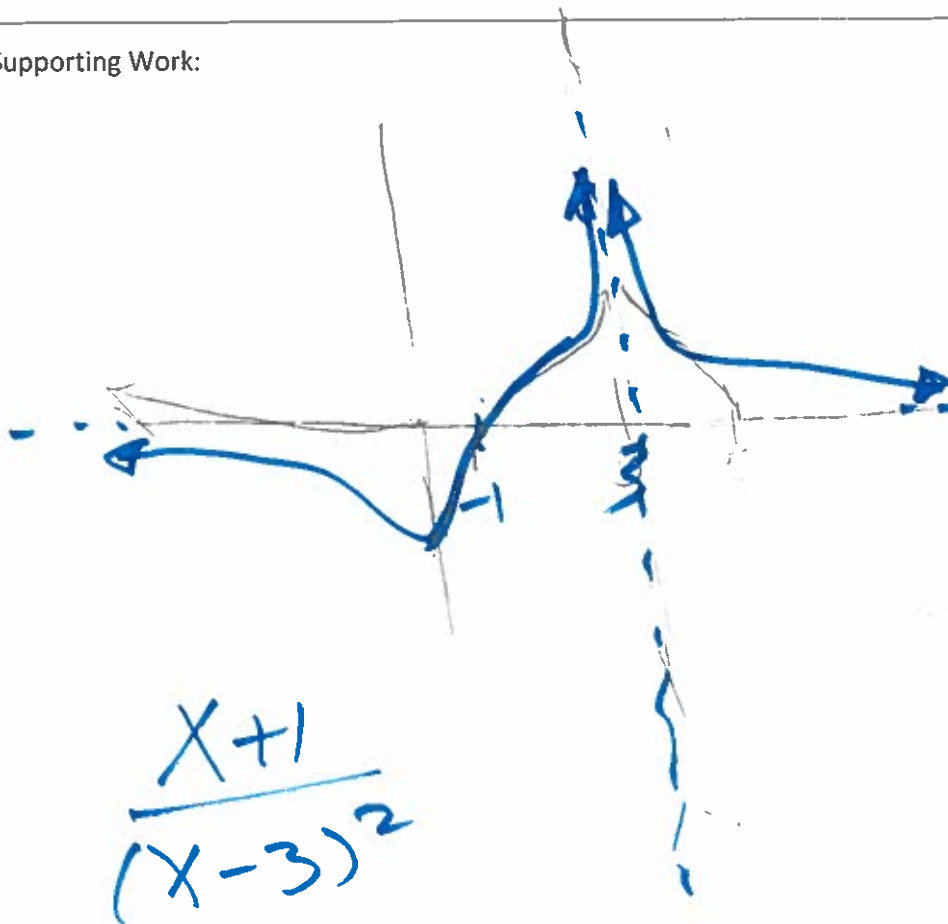
Writer/Prep: [unclear]

Dependant Variable (y-axis): y

Leader/Collaborator: [unclear]

Conclusion (in words):

Supporting Work:



HA:  $y=0$  DO NOT CROSS  
 VA:  $x=3$

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

$$\frac{(x+1)^1 (x+3)^0}{(x-3)^2 (x+3)^1}$$

HA:  $y=0$

$x=3$   $y=1$