Algebra 2 Name Key ID: 1

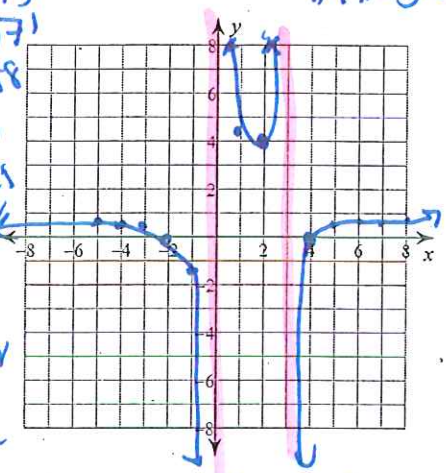
8.3 Graphing Rational Functions

Date 5-16-16 Period____

Identify the points of discontinuity, holes, vertical asymptotes, x-intercepts, y-intercepts, domain and horizontal asymptote of each. Then sketch the graph.

1) $f(x) = \dfrac{x^2 - 2x - 8}{x^2 - 3x}$ $\dfrac{(x-4)(x+2)}{x(x-3)}$

X	Y
-5	.675
-4	.571
-3	.388
-2	0
-1	-1.25
0	error
1	4.5
2	4
3	error
4	0
5	.7



VA @ x=0 & x=3

HA: @ y=1

x=4

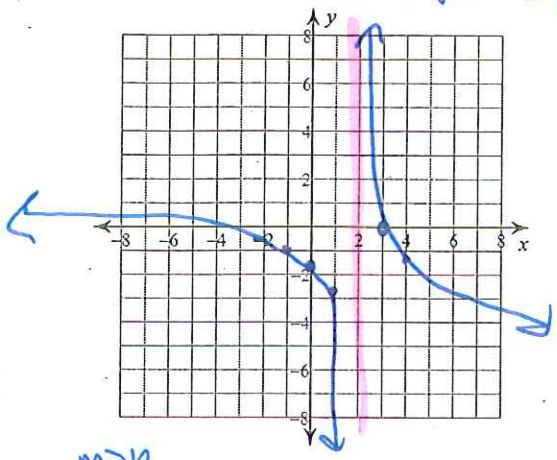
y=DNE

D: ℝ; x≠0, x≠3

R: ℝ y≠1

2) $f(x) = \dfrac{x^2 - 9}{-3x + 6}$ $\dfrac{(x+3)(x-3)}{-3(x-2)}$

X	Y
-2	-.41
-1	-.88
0	-1.5
1	-2.66
2	error
3	0
4	-1.67
5	
-3	0
-4	-3



* m>n NO HA

VA @ x=2

x=3

y=-1.5

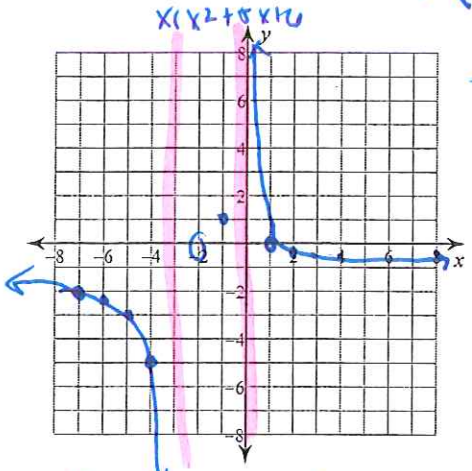
D: ℝ x≠2

R: ~~ℝ~~

3) $f(x) = \dfrac{-x^3 - x^2 + 2x}{x^3 + 5x^2 + 6x}$ $\dfrac{-1(x)\cancel{(x^2+x-2)}}{x(x+3)\cancel{(x+2)}}$

$x^3 - x^2 + 2x$

$x(x^2+5x+6)$



X	Y
-7	-2
-6	-2.33
-5	-3
-4	-5
-3	error
-2	error
-1	1
0	error
1	0
2	-.2
3	-.33
4	-.428
5	-.5

hole @ x=-2

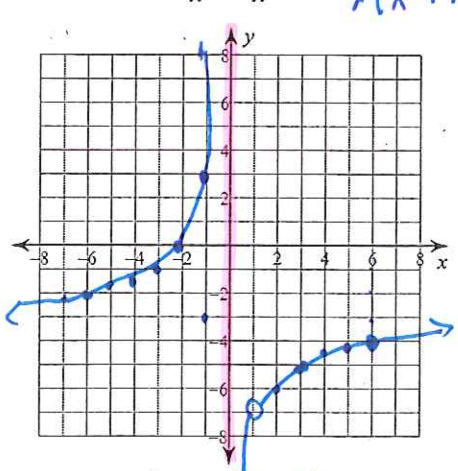
VA @ x=0 & x=-3

HA y=-1

D: ℝ x≠ 0, -2, -3

R: ℝ y≠-1

4) $f(x) = \dfrac{-3x^2 - 3x + 6}{x^2 - x}$ $\dfrac{-3(x^2+1x-2)}{x(x-1)}$



X	Y
-7	-2.14
-6	-2
-5	-1.8
-4	-1.5
-3	-1
-2	0
-1	3
0	error
1	error
2	-6
3	-5
4	-4.5
5	-4.2
6	-4

$\dfrac{-3\cancel{(x+2)(x-1)}}{x\cancel{(x-1)}}$

hole @ x=1

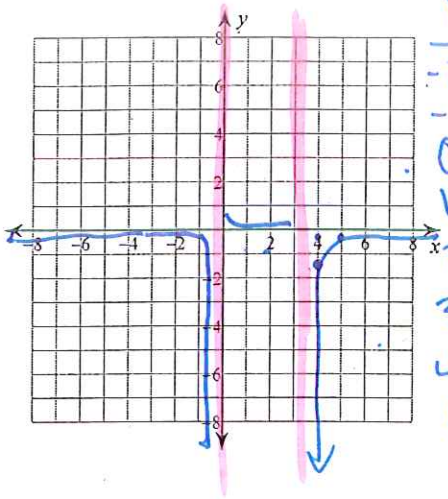
VA @ x=0

HA @ y=-3

D: ℝ; x≠0, x=1

R: ℝ y≠-3

5) $f(x) = \dfrac{1}{-2x^2 + 6x}$ $\quad \dfrac{1}{-2x(x-3)}$



X	Y
-2	-.05
-1	-.125
0	error
1	.25
2	.25
3	error
4	-1.25
5	-.05

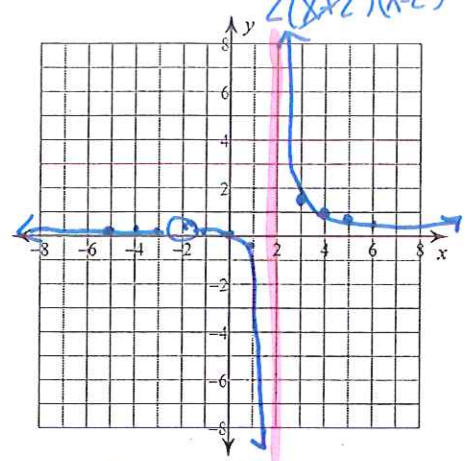
VA: x = 0 & 3

HA: y = 0

D: ℝ $x \neq 0, 3$

R: ℝ $y \neq 0$

6) $f(x) = \dfrac{x^2 + 2x}{2x^2 - 8}$ $\quad \dfrac{x(x+2)}{\cancel{2(x^2-4)}}$ $\quad \dfrac{2(x+2)(x-2)}{}$



X	Y
-5	.357
-4	.333
-3	.3
-2	error
-1	.166
0	0
1	-.5
2	error
3	1.5
4	1
5	.83
6	.75

hole @ x = -2

VA @ x = -2

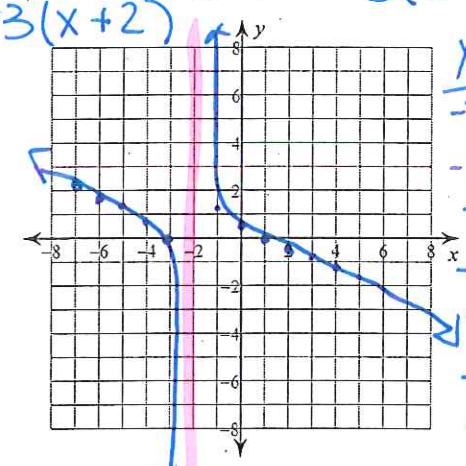
HA @ y = 1/2

D: ℝ $x \neq -2, 2$

R: ℝ $y \neq 1/2$

7) $f(x) = \dfrac{x^2 + 2x - 3}{-3x - 6}$ $\quad \dfrac{(x+3)(x-1)}{-3(x+2)}$

$-3(x+2)$



X	Y
-7	2.133
-6	1.75
-5	1.37
-4	.833
-3	0
-2	error
-1	1.33
0	.5
1	0
2	-.416
3	-.8
4	-1.167
5	-1.5721

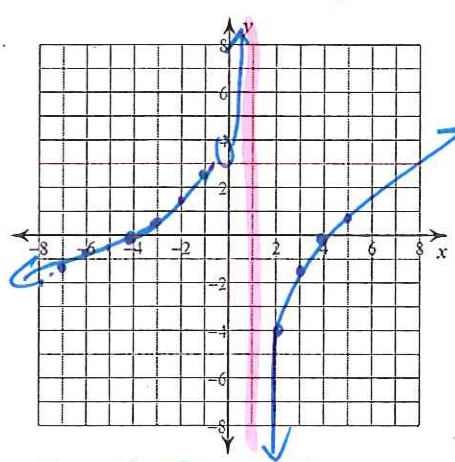
VA @ x = -2

HA @ none

D: ℝ $x \neq -2$

R: ℝ

8) $f(x) = \dfrac{x^3 - 16x}{3x^2 - 3x}$ $\quad \dfrac{x(x^2-16)}{3x(x-1)} = \dfrac{x(x+4)(x-4)}{3x(x-1)}$



X	Y
-7	-1.375
-6	-.95
-5	-.5
-4	0
-3	.58
2	1.33
-1	2.5
0	error
1	error
2	-4
3	-1.167
4	0
5	.75

hole @ x = 0

VA @ x = 1

HA: y = none

D: ℝ; $x \neq 0, 1$

R: ℝ

Algebra 2 Name Key ID: 1

8.3 Rational Functions

Date 5-10-16 Period

Find the information below. (Hint: You must factor numerator and denominator first!)

1) $f(x) = \frac{x^3 + 2x^2 - 8x}{4x^2 - 4x - 24}$ $\frac{x(x^2+2x-8)}{4(x^2-x-6)}$

$\frac{x(x+4)(x-2)}{4(x-3)(x+2)}$

Holes: none

Vertical Asymptotes: 3 & -2

Horizontal Asymptote: none [m>n]

x-intercept: 0, 2, -4

y-intercept: 0

Domain: $\mathbb{R}$ $x \neq 3$ & -2

2) $f(x) = \frac{x^3 - x}{4x^2 - 8x}$ $\frac{x(x^2-1)}{4x(x-2)}$

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

Holes: $x = 0$

Vertical Asymptotes: $x = 2$

Horizontal Asymptote: none [m>n]

x-intercept: 1, -1

y-intercept: none

Domain: $\mathbb{R}$: $x \neq 0$ & 2

3) $f(x) = \frac{x^3 - 2x^2 - 8x}{-4x^2 - 12x}$ $\frac{x(x^2-2x-8)}{-4x(x+3)}$

$\frac{x(x-4)(x+2)}{-4x(x+3)}$

Holes: 0

Vertical Asymptotes: -3

Horizontal Asymptote: none [m>n]

x-intercept: ~~0~~, 4, -2

y-intercept: none

Domain: $\mathbb{R}$: $x \neq 0, -3$

4) $f(x) = \frac{x^2 - 3x - 4}{-4x + 4}$

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

Holes: none

Vertical Asymptotes: 1

Horizontal Asymptote: none [m>n]

x-intercept: 4 & -1

y-intercept: -1

Domain: $\mathbb{R}$: $x \neq 1$

$x(x^2+2x-8)$

5) $f(x) = \dfrac{x^3 + 2x^2 - 8x}{4x^2 - 16}$ $4(x^2+4)$

$\dfrac{x(x+4)(x-2)}{4(x-2)(x+2)}$

Holes: 2

Vertical Asymptotes: -2

Horizontal Asymptote: none $m>n$

x-intercept: $0, -4$

y-intercept: 0

Domain: $\mathbb{R}, x \neq 2, -2$

6) $f(x) = \dfrac{x^3 - 3x^2 - 4x}{-3x^2 + 9x}$ $\dfrac{x(x^2-3x-4)}{-3x(x-3)}$

$\dfrac{x(x-4)(x+1)}{3x(x-3)}$

Holes: 0

Vertical Asymptotes: 3

Horizontal Asymptote: none $m>n$

x-intercept: ~~0~~, 4, -1

y-intercept: none

Domain: $\mathbb{R}$: $x \neq 0, 3$

7) $f(x) = \dfrac{1}{x+3}$

Holes: none

Vertical Asymptotes: -3

Horizontal Asymptote: $y=0$ $m<n$

x-intercept: none

y-intercept: $1/3$

Domain: $\mathbb{R}$: $x \neq -3$

8) $f(x) = \dfrac{x+2}{-2x-8}$

$\dfrac{x+2}{-2(x+4)}$

Holes: none

Vertical Asymptotes: -4

Horizontal Asymptote: $y = -1/2$ $m=n$

x-intercept: -2,

y-intercept: $y = -.25$

Domain: $\mathbb{R}$: $x \neq -4$