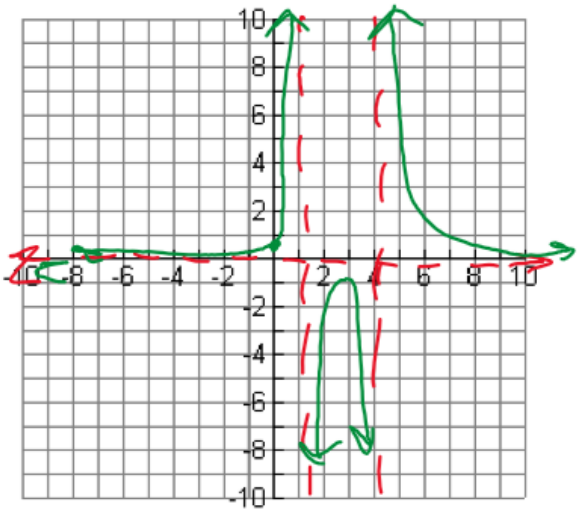
Algebra II
GRAPHING RATIONAL FUNCTIONS

NAME_____
DATE _____

Find in the blanks. Graph the asymptotes with dotted lines. Then graph the functions.

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

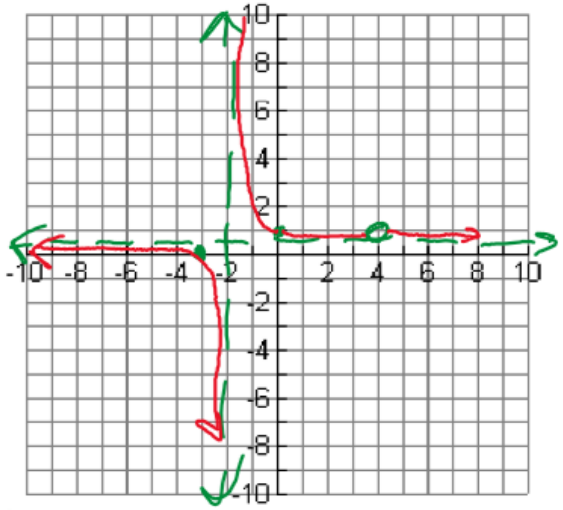
Domain: $\mathbb{R}$ $x \neq 4$ $x \neq 1$
Range: $\mathbb{R}$ $y \neq 0$
Vertical Asymptote: $x=4$ $x=1$
Horizontal Asymptote: $y=0$
Slant Asymptote: None
Holes: None
x-int: None y-int: $(0, 1/2)$



2. $f(x) = \frac{x^2-x+12}{2x^2-4x-16} = \frac{(x-4)(x+3)}{2(x-4)(x+2)}$

Domain: $\mathbb{R}$ $x \neq -2$ $x \neq 4$
Range: $\mathbb{R}$ $y \neq 1/2$, $y \neq 7/12$
Vertical Asymptote: $x=-2$
Horizontal Asymptote: $y=1/2$
Slant Asymptote: None
Holes: $(4, 7/12)$
x-int: $(-3, 0)$ y-int: $(0, 3/4)$

$\frac{4+3}{2(4+2)}$ $\frac{0+3}{2(0+2)}$

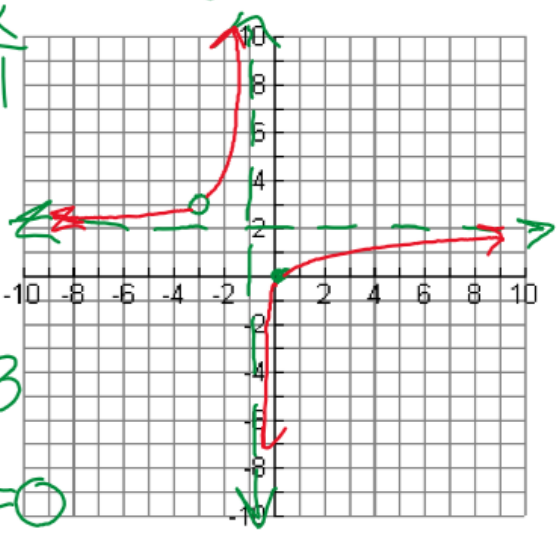


3. $f(x) = \frac{2x^2+6x}{x^2+4x+3} = \frac{2x(x+3)}{(x+3)(x+1)} = \frac{2x}{x+1}$

Domain: $\mathbb{R}$ $x \neq -1, -3$
Range: $\mathbb{R}$ $y \neq 2, 3$
Vertical Asymptote: $x=-1$
Horizontal Asymptote: $y=2$
Slant Asymptote: None
Holes: $(-3, 3)$
x-int: $(0, 0)$ y-int: $(0, 0)$

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

$\frac{2x}{2} = \frac{0}{2}$
$x = 0$



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

Domain: $\mathbb{R}$ $x \neq 1$, $y \neq 3$

Range: $\mathbb{R}$ $y = x-3$

Vertical Asymptote: $x=1$

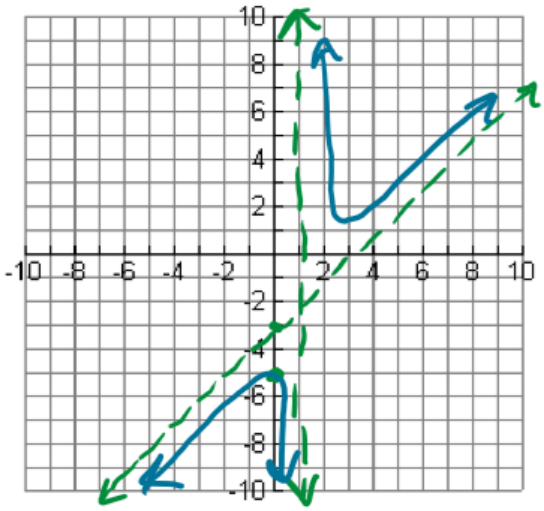
Horizontal Asymptote: None

Slant Asymptote: $y = x-3$

Holes: None

x-int: None y-int: $(0, -5)$

1 | 1 -4 5
1 -3
1 -3 | -5



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

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

Range: $\mathbb{R}$ $y \neq x+3$

Vertical Asymptote: $x=2$

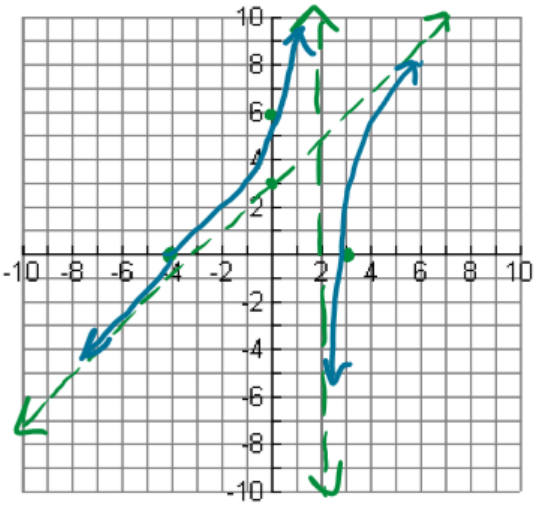
Horizontal Asymptote: None

Slant Asymptote: $y = x+3$

Holes: None

x-int: $(-4,0)$ $(3,0)$ y-int: $(0,6)$

2 | 1 1 -12
2 6
1 3 | -6



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

Domain: $x \neq -2, 2$

Range: $\mathbb{R}$ $y \neq 1$

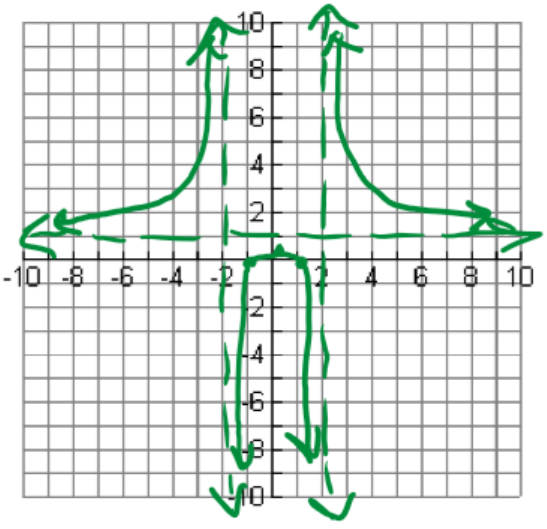
Vertical Asymptote: $x = -2, 2$

Horizontal Asymptote: $y = 1$

Slant Asymptote: None

Holes: None

x-int: $(1,0)$ $(-1,0)$ y-int: $(0, \frac{1}{4})$



7. Write an equation of a rational function that has a horizonal asymptote of y=1/2.

$y = \frac{1x^2+1}{2x^2+3}$

8. Write the equation of a rational function that has a vertical asymptote at x= -1 and x-intercept of (3,0).

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