

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

Name _____

Date _____ Period _____

x	-2	-1	-0.5	0.5	1	2
y	-0.5	-1	-2	2	1	0.5

Accelerated Geometry

13.4 Test Review

Find the characteristics listed for each rational function. Graph using an x/y table.

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

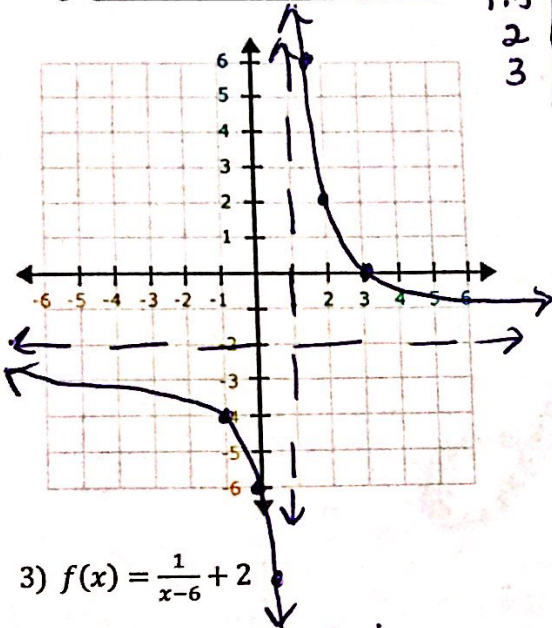
Vertical Asymptote: $x=1$

Horizontal Asymptote: $y=-2$

Domain: $\{x \mid x \neq 1\}$

Range: $\{y \mid y \neq -2\}$

x+1	4y-2
-1	-4
0	-6
0.5	-10
1.5	6
2	2
3	0



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

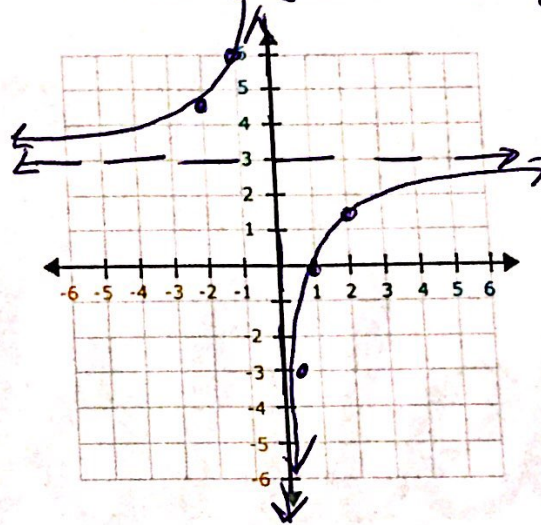
Vertical Asymptote: $x=0$

Horizontal Asymptote: $y=3$

Domain: $\{x \mid x \neq 0\}$

Range: $\{y \mid y \neq 3\}$

x	-3y+3
-2	4.5
-1	6
-0.5	9
0.5	-3
1	0
2	1.5



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

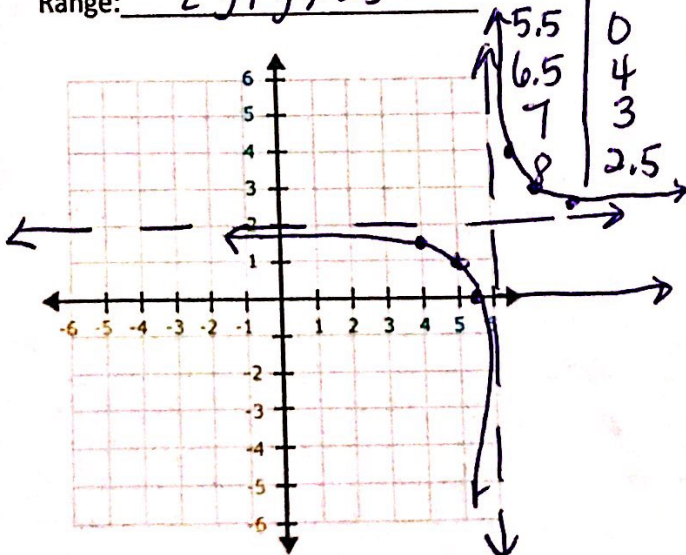
Vertical Asymptote: $x=6$

Horizontal Asymptote: $y=2$

Domain: $\{x \mid x \neq 6\}$

Range: $\{y \mid y \neq 2\}$

x+6	y+2
4	1.5
5	1
5.5	0
6.5	4
7	3
8	2.5



4) $f(x) = -\frac{1}{x} + 7$

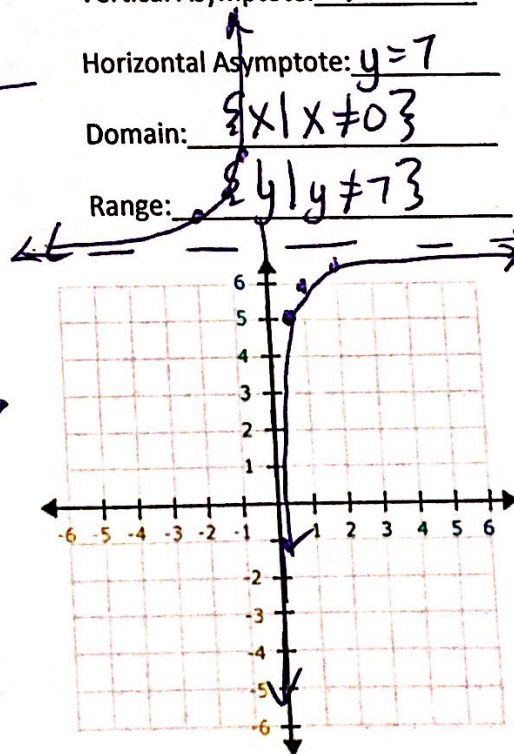
Vertical Asymptote: $x=0$

Horizontal Asymptote: $y=7$

Domain: $\{x \mid x \neq 0\}$

Range: $\{y \mid y \neq 7\}$

x	-y+7
-2	7.5
-1	8
-0.5	9
0.5	5
1	6
2	6.5



For problems 5-7, write a rational function given the characteristics.

5) zeros at 5 & -2, vertical asymptote at $x=-7$, hole at $x=0$.

$$\frac{x(x-5)(x+2)}{x(x+7)} = \frac{x(x^2-3x-10)}{x^2+7x} \quad f(x) = \frac{x^3-3x^2-10x}{x^2+7x}$$

6) zeros at 0 and -6, vertical asymptote at $x=5$ and -5 , horizontal asymptote at $y=1$

$$\frac{x(x+6)}{(x-5)(x+5)} \quad f(x) = \frac{x^2+6x}{x^2-25}$$

7) zero at $x=1$, hole at $x=-8$.

$$\frac{(x-1)(x+8)}{(x+8)} \quad f(x) = \frac{x^2+7x-8}{x+8}$$

For problems 8-10, you must a) re-write each function in the form of $f(x) = \frac{a}{x-h} + k$ and b) describe the transformations from the parent graph of $f(x) = \frac{1}{x}$

8) $f(x) = \frac{x-3}{x-7}$

$$f(x) = \frac{4}{x-7} + 1$$

v stretch by 4
shift right 7
shift up 1

9) $f(x) = \frac{8x}{x+6}$

$$f(x) = \frac{-48}{x+6} + 8$$

ref x-axis
v stretch by 48
shift left 6
shift up 8

10) $f(x) = \frac{5x-4}{x-2}$

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

v stretch by 6
shift right 2
shift up 5

Find the characteristics listed for each rational function. Graph using a graphing calculator.

$$11) f(x) = \frac{4x^2-4}{2x^2-18} = \frac{4(x^2-1)}{2(x^2-9)} = \frac{4(x+1)(x-1)}{2(x+3)(x-3)}$$

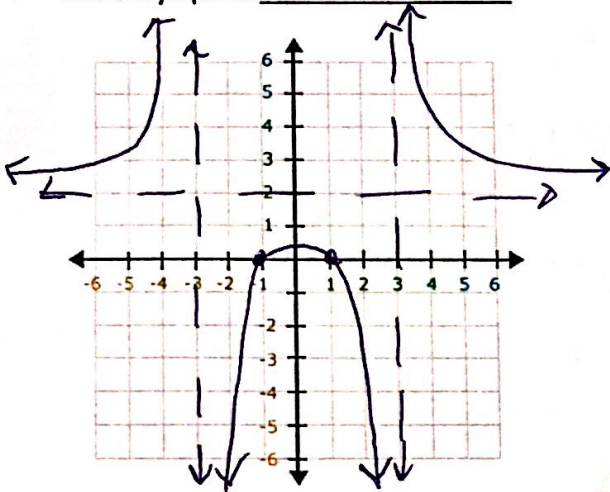
Hole(s): none

Zero(s): $x = \pm 1$

Vertical Asymptote(s): $x = \pm 3$

Horizontal Asymptote: $y = 2$

Slant Asymptote: none



$$12) f(x) = \frac{x^2-x-20}{x-5} = \frac{(x-5)(x+4)}{(x-5)}$$

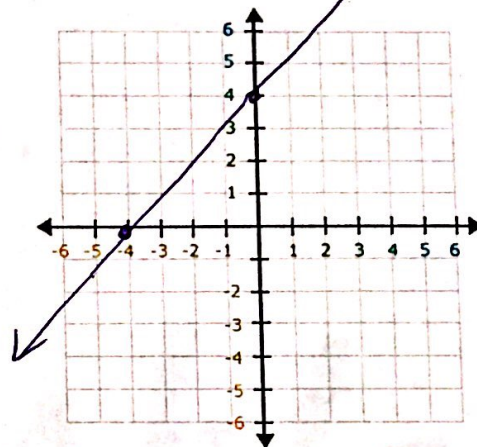
Hole(s): $x = 5$

Zero(s): $x = -4$

Vertical Asymptote(s): none

Horizontal Asymptote: none

Slant Asymptote: none



$$13) f(x) = \frac{4x+8}{3x^2-12} = \frac{4(x+2)}{3(x^2-4)} = \frac{4(x+2)}{3(x+2)(x-2)}$$

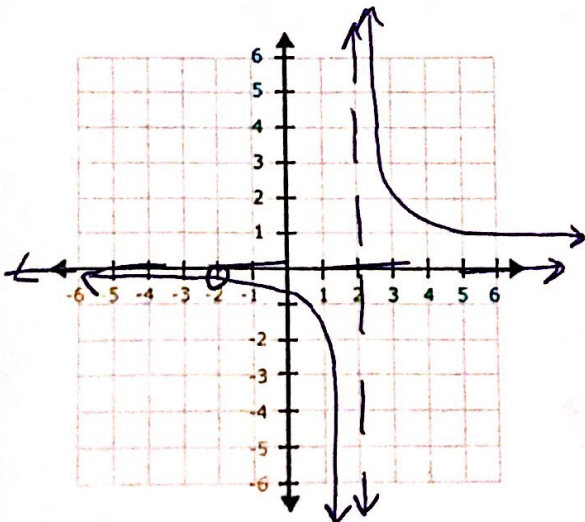
Hole(s): $x = -2$

Zero(s): none

Vertical Asymptote(s): $x = 2$

Horizontal Asymptote: $y = 0$

Slant Asymptote: none



$$14) f(x) = \frac{x^2+x}{x+2} = \frac{x(x+1)}{x+2}$$

$$\begin{array}{r} x-1 \\ x+2 \overline{) x^2+x} \\ \underline{-x^2-2x} \\ -x \end{array}$$

Hole(s): none

Zero(s): $x = 0, -1$

Vertical Asymptote(s): $x = -2$

Horizontal Asymptote: none

Slant Asymptote: $y = x-1$

