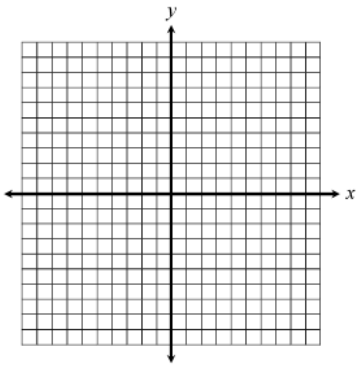
Simplify:

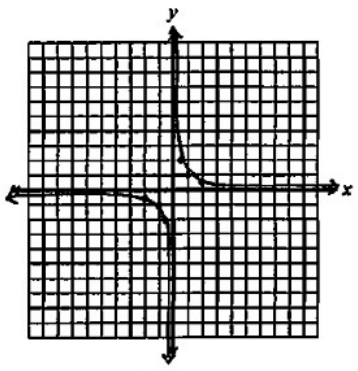
$$\frac{x^2y^3}{x^4y^2} \div 2xy$$

Project stuff: Growth Rate. Exponential solving when pop is 1000. Any other questions?

Name:	Date:
Topic:	Class:

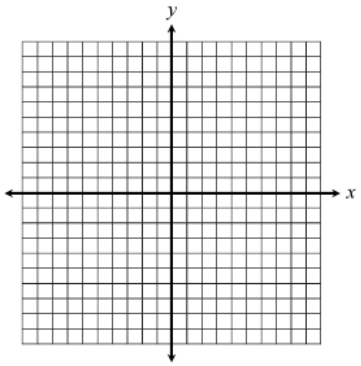
Main Ideas/Questions	Notes/Examples
RECIPROCAL *Parent Function*	 **Type of Graph:** _____ **Domain:** _____ **Range:** _____ **Vertical Asymptote:** _____ **Horizontal Asymptote:** _____
STANDARD FORM *of a Reciprocal Function*	**TRANFORMATIONS:** • h is the _____ shift. (+ shifts _____, – shifts _____) • k is the _____ shift. (+ shifts _____, – shifts _____) • If a is negative, the function is _____ across the ____- _____ • $\lvert a\rvert > 1$ represents a vertical _____. • $0 < \lvert a\rvert < 1$ represents a vertical _____.
	VERTICAL ASYMPTOTE: / **HORIZONTAL ASYMPTOTE:**
Writing Functions	**1.** The reciprocal parent function is reflected across the x-axis, then translated 4 units right and 3 units down. Write an equation to represent the new function. Identify the asymptotes.
	2. The reciprocal parent function is vertically stretched by a factor of 2, then translated 7 units up and 1 unit left. Write an equation to represent the new function. Identify the asymptotes.
	3. A recriprocal function has a vertical asymptote located at x = -2 and a horizontal asymptote located at y = 5. Write an equation that could represent this function.

Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples
RECIPROCAL *Parent Function* $f(x) = \frac{1}{x}$	 Type of Graph: hyperbola Domain: $\{x \mid x \neq 0\}$ Range: $\{y \mid y \neq 0\}$ Vertical Asymptote: $x = 0$ Horizontal Asymptote: $y = 0$
STANDARD FORM *of a Reciprocal Function* $f(x) = \frac{a}{x-h} + k$	**TRANFORMATIONS:** • h is the horizontal shift. (+ shifts left, − shifts right) • k is the vertical shift. (+ shifts up, − shifts down) • If a is negative, the function is reflected across the x-axis • $\lvert a \rvert > 1$ represents a vertical stretch. • $0 < \lvert a \rvert < 1$ represents a vertical compression
	VERTICAL ASYMPTOTE: $x = h$ — **HORIZONTAL ASYMPTOTE:** $y = k$
Writing Functions	**1.** The reciprocal parent function is translated 4 units right and 3 units down, then refelcted across the x-axis. Write an equation to represent the new function. Identify the asymptotes. $f(x) = \frac{-1}{x-4} - 3$ VA: $x = 4$ HA: $y = -3$
	2. The reciprocal parent function is translated 7 units up and 1 unit left, then vertically stretched by a factor of 2. Write an equation to represent the new function. Identify the asymptotes. $f(x) = \frac{2}{x+1} + 7$ VA: $x = -1$ HA: $y = 7$
	3. A reciprocal function has a vertical asymptote located at $x = -2$ and a horizontal asymptote located at $y = 5$. Write an equation that could represent this function. $f(x) = \frac{1}{x+2} + 5$

Directions: Graph each function. Identify the domain, range, and asymptotes.

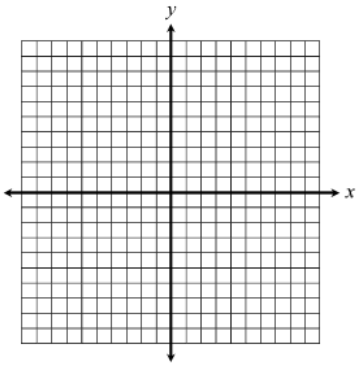
4. $f(x) = \frac{1}{x} - 2$



Domain: _____ **VA:** _____

Range: _____ **HA:** _____

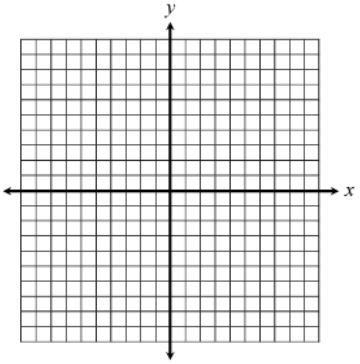
5. $f(x) = \frac{1}{x+3}$



Domain: _____ **VA:** _____

Range: _____ **HA:** _____

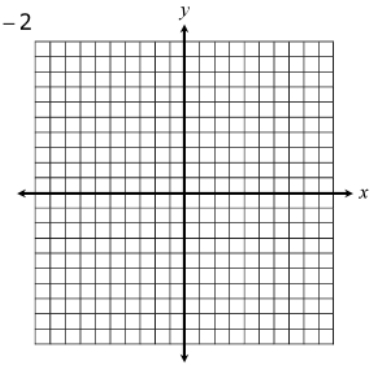
6. $f(x) = \frac{-4}{x} + 1$



Domain: _____ **VA:** _____

Range: _____ **HA:** _____

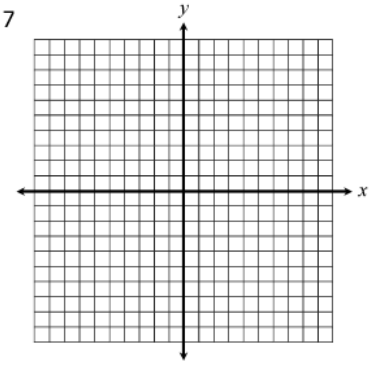
7. $f(x) = \frac{3}{x-2} - 2$



Domain: _____ **VA:** _____

Range: _____ **HA:** _____

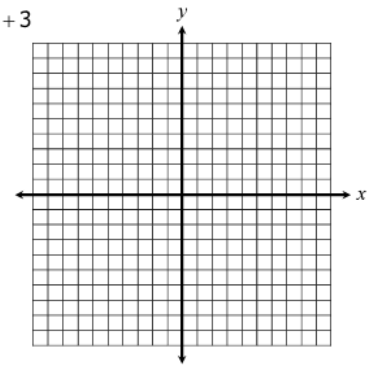
8. $f(x) = \frac{2}{x+4} - 7$



Domain: _____ **VA:** _____

Range: _____ **HA:** _____

9. $f(x) = \frac{-1}{x-5} + 3$

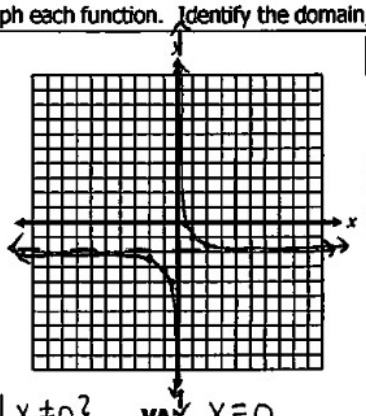


Domain: _____ **VA:** _____

Range: _____ **HA:** _____

Directions: Graph each function. Identify the domain, range, and asymptotes.

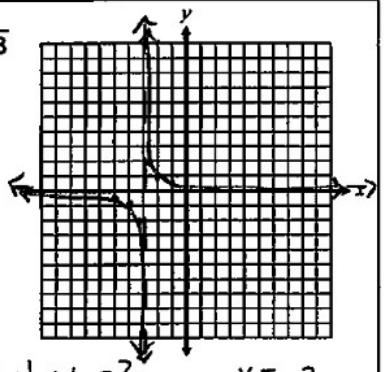
4. $f(x)=\frac{1}{x}-2$



Domain: $\{x \mid x \neq 0\}$ **VA:** $x=0$

Range: $\{y \mid y \neq -2\}$ **HA:** $y=-2$

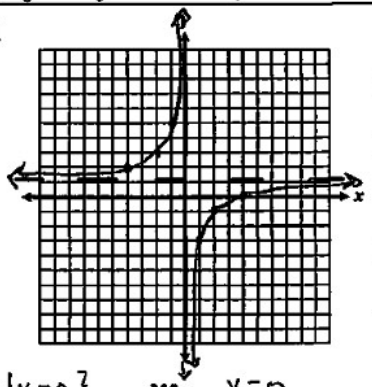
5. $f(x)=\frac{1}{x+3}$



Domain: $\{x \mid x \neq -3\}$ **VA:** $x=-3$

Range: $\{y \mid y \neq 0\}$ **HA:** $y=0$

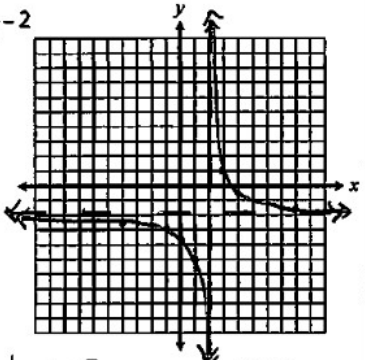
6. $f(x)=\frac{-4}{x}+1$



Domain: $\{x \mid x=0\}$ **VA:** $x=0$

Range: $\{y \mid y \neq 1\}$ **HA:** $y=1$

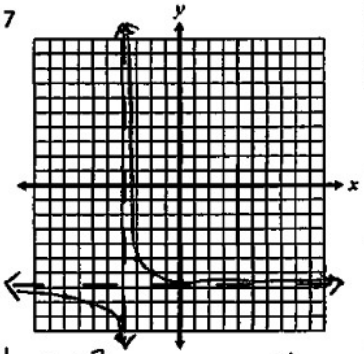
7. $f(x)=\frac{3}{x-2}-2$



Domain: $\{x \mid x \neq 2\}$ **VA:** $x=2$

Range: $\{y \mid y \neq -2\}$ **HA:** $y=-2$

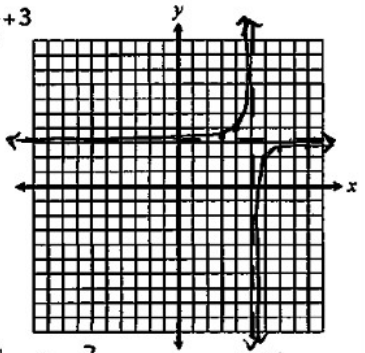
8. $f(x)=\frac{2}{x+4}-7$



Domain: $\{x \mid x \neq -4\}$ **VA:** $x=-4$

Range: $\{y \mid y \neq -7\}$ **HA:** $y=-7$

9. $f(x)=\frac{-1}{x-5}+3$



Domain: $\{x \mid x \neq 5\}$ **VA:** $x=5$

Range: $\{y \mid y \neq 3\}$ **HA:** $y=3$

Name: _____ **Unit 8:** Rational Functions

Date: _____ **Bell:** _____ **Homework 6:** Graphing Reciprocal Functions

**** This is a 2-page document! ****

The following changes represent transformations from the reciprocal parent function. Write an equation to represent the new function, then identify the asymptotes.

1. Translated 2 units left and 9 units down.

2. Reflected across the x-axis, then translated 5 units up.

3. Vertically stretched by a factor of 4, then translated 3 units right.

4. Vertically stretched by a factor of 2, reflected across the x-axis, then translated 1 unit left and 8 units up.

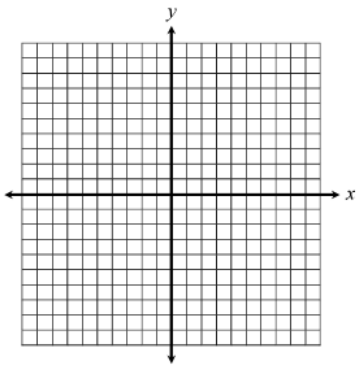
The vertical and horizontal asymptotes of a reciprocal function are given below. Write an equation that could represent the function.

5. Asymptotes: $x = 3$ and $y = -2$.

6. Asymptotes: $x = -7$ and $y = 0$

Graph each function. Identify the domain, range, and asymptotes.

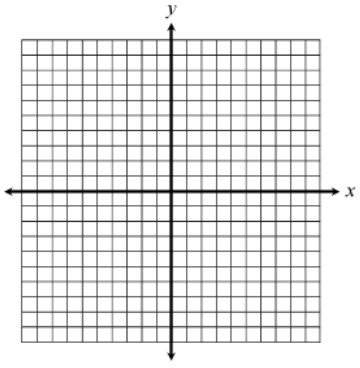
7. $f(x) = \frac{1}{x} + 3$



Domain: _____ **VA:** _____

Range: _____ **HA:** _____

8. $f(x) = \frac{-1}{x}$



Domain: _____ **VA:** _____

Range: _____ **HA:** _____

Name: _____ **Unit 8:** Rational Functions

Date: _____ **Bell:** _____ **Homework 6:** Graphing Reciprocal Functions

**** This is a 2-page document! ****

The following changes represent transformations from the reciprocal parent function. Write an equation to represent the new function, then identify the asymptotes.

1. Translated 2 units left and 9 units down.

$f(x) = \frac{1}{x+2} - 9$

VA: $x = -2$
HA: $y = -9$

2. Translated 5 units up and reflected across the x-axis.

$f(x) = \frac{-1}{x} + 5$

VA: $x = 0$
HA: $y = 5$

3. Translated 3 units right and vertically stretched by a factor of 4.

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

VA: $x = 3$
HA: $y = 0$

4. Translated 1 unit left and 8 units up, vertically stretched by a factor of 2, then reflected across the x-axis.

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

VA: $x = -1$ HA: $y = 8$

The vertical and horizontal asymptotes of a reciprocal function are given below. Write an equation that could represent the function.

5. Asymptotes: $x = 3$ and $y = -2$.

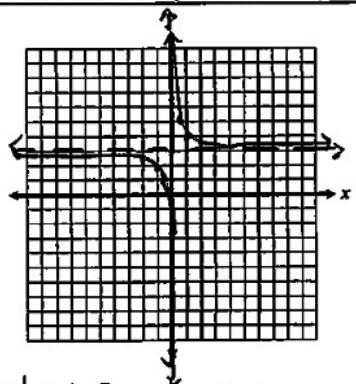
$f(x) = \frac{1}{x-3} - 2$

6. Asymptotes: $x = -7$ and $y = 0$

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

Graph each function. Identify the domain, range, and asymptotes.

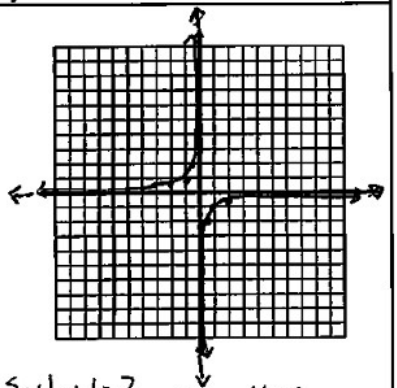
7. $f(x) = \frac{1}{x} + 3$



Domain: $\{x \mid x \neq 0\}$ **VA:** $x = 0$

Range: $\{y \mid y \neq 3\}$ **HA:** $y = 3$

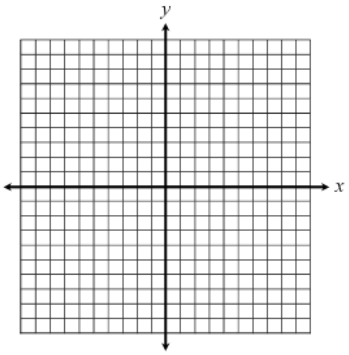
8. $f(x) = \frac{-1}{x}$



Domain: $\{x \mid x \neq 0\}$ **VA:** $x = 0$

Range: $\{y \mid y \neq 0\}$ **HA:** $y = 0$

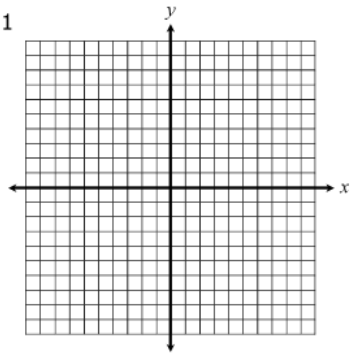
9. $f(x) = \frac{1}{x-4}$



Domain: _____ **VA:** _____

Range: _____ **HA:** _____

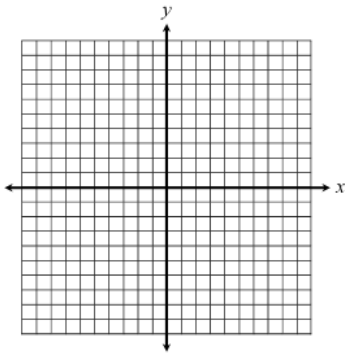
10. $f(x) = \frac{3}{x+2} - 1$



Domain: _____ **VA:** _____

Range: _____ **HA:** _____

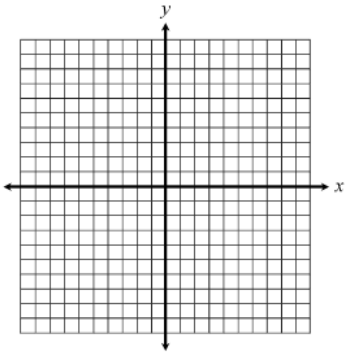
11. $f(x) = \frac{2}{x} - 5$



Domain: _____ **VA:** _____

Range: _____ **HA:** _____

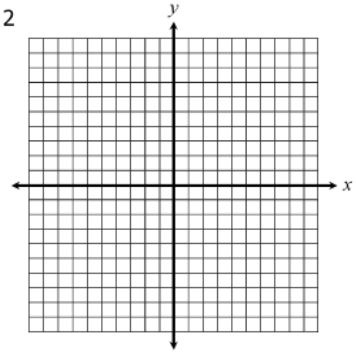
12. $f(x) = \frac{-1}{x-6}$



Domain: _____ **VA:** _____

Range: _____ **HA:** _____

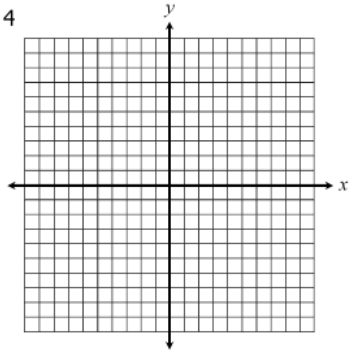
13. $f(x) = \frac{4}{x-1} - 2$



Domain: _____ **VA:** _____

Range: _____ **HA:** _____

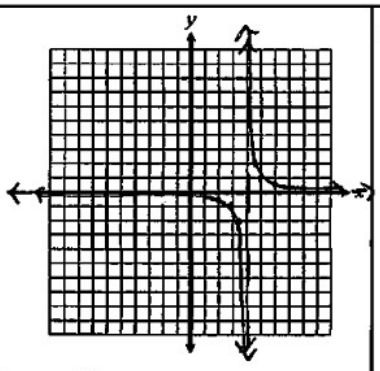
14. $f(x) = \frac{-3}{x+5} + 4$



Domain: _____ **VA:** _____

Range: _____ **HA:** _____

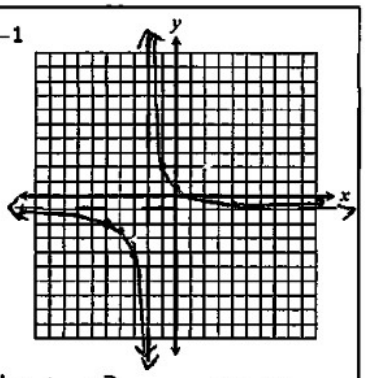
9. $f(x)=\frac{1}{x-4}$



Domain: $\{x \mid x \neq 4\}$ VA: $x=4$

Range: $\{y \mid y \neq 0\}$ HA: $y=0$

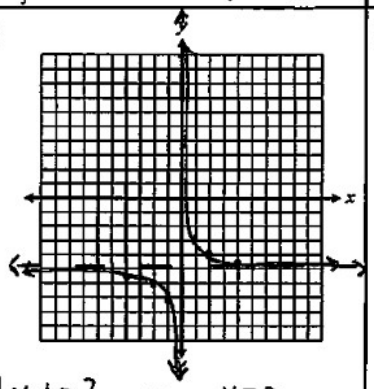
10. $f(x)=\frac{3}{x+2}-1$



Domain: $\{x \mid x \neq -2\}$ VA: $x=-2$

Range: $\{y \mid y \neq -1\}$ HA: $y=-1$

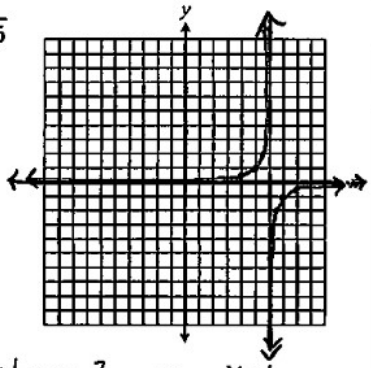
11. $f(x)=\frac{2}{x}-5$



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

Range: $\{y \mid y \neq -5\}$ HA: $y=-5$

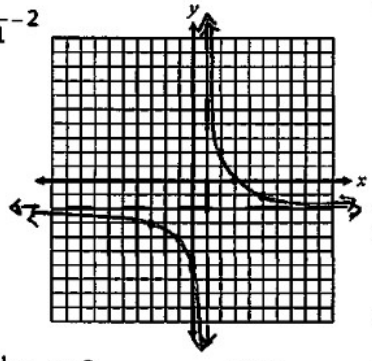
12. $f(x)=\frac{-1}{x-6}$



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

Range: $\{y \mid y \neq 0\}$ HA: $y=0$

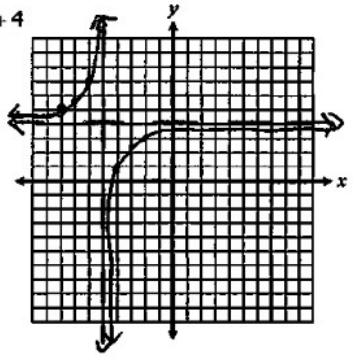
13. $f(x)=\frac{4}{x-1}-2$



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

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

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



Domain: $\{x \mid x \neq -5\}$ VA: $x=-5$

Range: $\{y \mid y \neq 4\}$ HA: $y=4$

Finish the homework and project!