

AA PREP: GRAPHING RATIONAL FUNCTIONS WITH TRANSFORMATIONS—LECTURE

Graph the rational parent function. Then, graph each of the following rational functions using transformations. State domain and range.

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

V ASYMPTOTE
 $x = 0$

x	y
-3	$-\frac{1}{3}$
-2	$-\frac{1}{2}$
-1	-1
0	$\frac{1}{0} = \text{UNDEF}$
1	1
2	$\frac{1}{2}$
3	$\frac{1}{3}$

H ASYMPTOTE
 $y = 0$

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

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

REFLECTS
OVER
 x -axis

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

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

V TRANSLATION
3 (D)

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

4. $y = \frac{1}{x+3}$

H TRANSLATION
3 (L)

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

5. $g(x) = \frac{3}{x}$

V STRETCH
 $\times 3$
(y-VALUES)
 $\times 3$

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

6. $g(x) = \frac{1}{x-4} + 5$

H TRANSLATION
4 (R)

V TRANSLATION
5 (U)

Domain: $\mathbb{R}, x \neq 4$ Range: $\mathbb{R}, y \neq 5$