

Honors Math 3: WARM UP/Review Graphing Rationals

Key

Given the following, describe the transformation from $y = 1/x$, determine the equations of the vertical and horizontal asymptotes, give the domain and range (in interval notation) and graph.

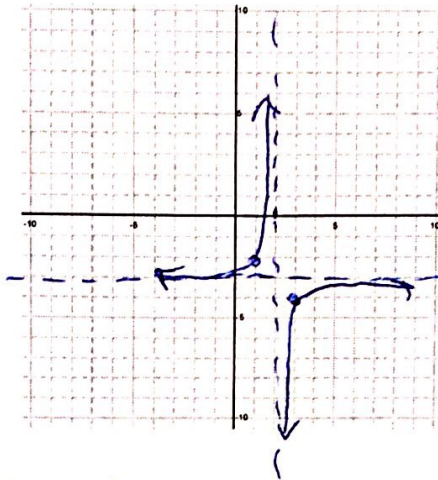
1. $y = \frac{-1}{x-2} - 3$

Transformation:

vt 2 down 3.
Reflect x-axis

Vert A: $x = 2$

Horiz A: $y = -3$



Domain: $(-\infty, 2) \cup (2, \infty)$

Range: $(-\infty, -3) \cup (-3, \infty)$

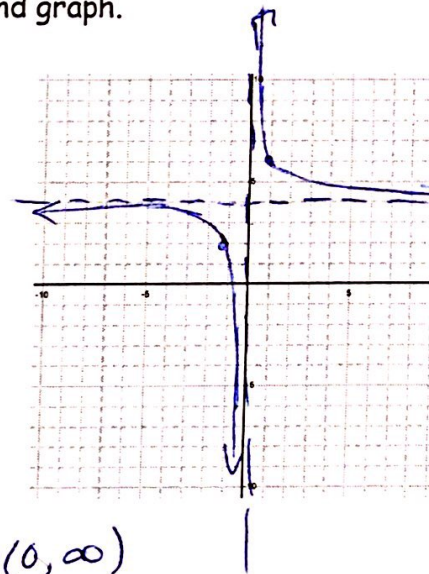
2. $y = \frac{2}{x} + 4$

Transformation:

UP 4
Vert stretch 2

Vert A: $x = 0$

Horiz A: $y = 4$



Domain: $(-\infty, 0) \cup (0, \infty)$

Range: $(-\infty, 4) \cup (4, \infty)$

For the following rational functions, determine the equations of all asymptotes (Vert and Horiz), give the location of any holes (point discontinuities), determine the x and y intercepts, and give the domain of the function in interval notation. If "none", say "none". Asymptotes should be EQUATIONS and holes/intercepts should be given as points.

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

Vert: $x = -4$

Horiz: $y = 3$

Holes: $(0, -3/2)$

x-int: $(2, 0)$

y-int: None (there is a hole)

domain:

$(-\infty, -4) \cup (-4, 0) \cup (0, \infty)$

4. $f(x) = \frac{(x-1)(x^2+x+1)}{x^2+1} \rightarrow * \text{never} = 0!$

Vert: None

Horiz: None

Holes: None

x-int: $(1, 0)$

y-int: $(0, -1)$

domain:

$(-\infty, \infty)$

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

Vert: $x = -3$ $x = 3$

Horiz: $y = 0$

Holes: None

x-int: $(-2, 0)$

y-int: $(0, -4/9)$

domain:

$(-\infty, -3) \cup (-3, 3) \cup (3, \infty)$

6. Give an equation of a rational function which would have a hole at $x = 5$ and a vertical asymptote at $x = -2$. Leave your answer in factored form.

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