

Honors Algebra 2
Graphing Rational Functions

Rational Reasoner: Key
Date: _____ Period: _____

Complete all of the information below to graph each rational function.

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

y-intercept: (0, 0) x-int: (0, 0)

Holes: none

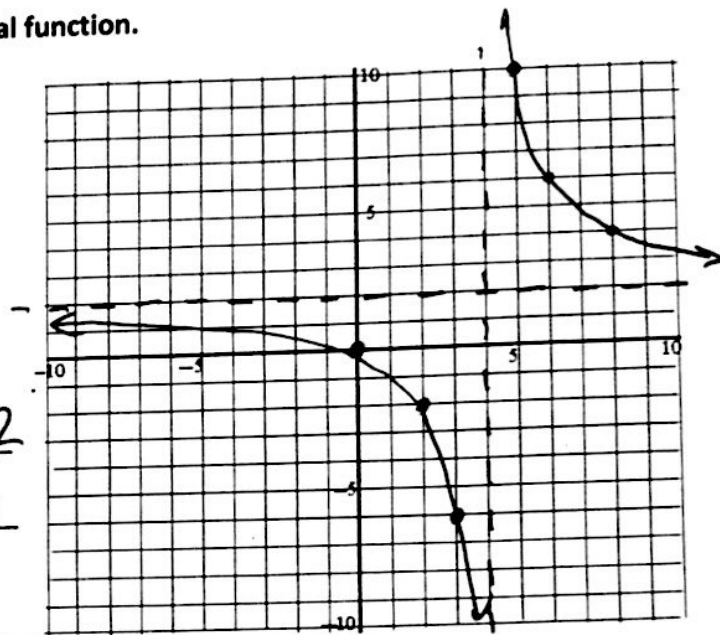
Vertical Asymptotes: X=4 Horizontal Asymptotes: y=2

Domain: $(-\infty, 4) \cup (4, \infty)$ Range: $(-\infty, 2) \cup (2, \infty)$

End-Behavior:

as $x \rightarrow -\infty, y \rightarrow 2$

as $x \rightarrow \infty, y \rightarrow 2$



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

y-intercept: $(0, \frac{1}{9})$ x-int: none

Holes: none

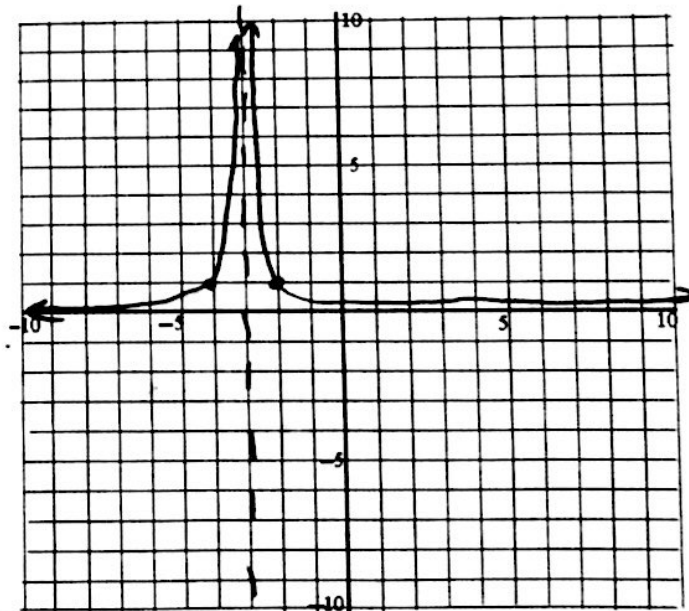
Vertical Asymptotes: X=-3 Horizontal Asymptotes: y=0

Domain: $(-\infty, -3) \cup (-3, \infty)$ Range: $(0, \infty)$

End-Behavior:

as $x \rightarrow -\infty, y \rightarrow 0$

as $x \rightarrow \infty, y \rightarrow 0$



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

y-intercept: (0, -2) x-int: (-4, 0)

Holes: none

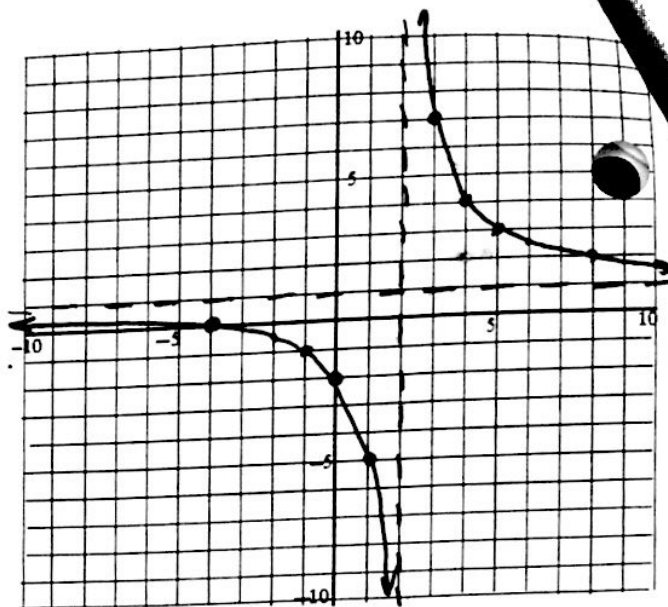
Vertical Asymptotes: $x=2$ Horizontal Asymptotes: $y=1$

Domain: $(-\infty, 2) \cup (2, \infty)$ Range: $(-\infty, 1) \cup (1, \infty)$

End-Behavior:

as $x \rightarrow -\infty, y \rightarrow 1$

as $x \rightarrow \infty, y \rightarrow 1$



4.) $k(x) = \frac{x^2 - 16}{x + 4} = \frac{(x+4)(x-4)}{(x+4)}$
 An arrow points from the $(x+4)$ term in the denominator to the word "hole".

y-intercept: (0, -4) x-int: (4, 0)

Holes: (-4, -8)

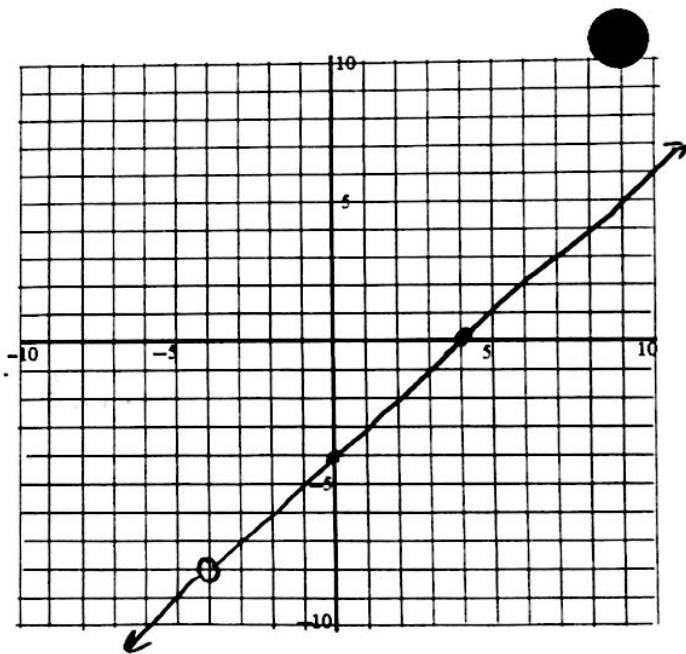
Vertical Asymptotes: none Horizontal Asymptotes: none

Domain: $(-\infty, -4) \cup (-4, \infty)$ Range: $(-\infty, -8) \cup (-8, \infty)$

End-Behavior:

as $x \rightarrow -\infty, y \rightarrow -\infty$

as $x \rightarrow \infty, y \rightarrow \infty$



5.) $g(x) = \frac{-3}{(x-1)(x+6)}$

y-intercept: $(0, \frac{1}{2})$ x-int: none

Holes: none

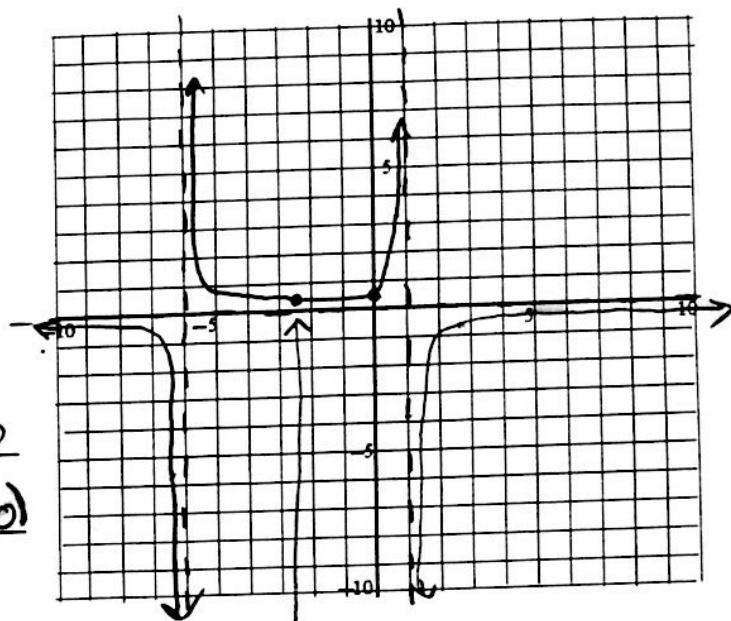
Vertical Asymptotes: $X=1, X=-6$ Horizontal Asymptotes: $Y=0$

Domain: $(-\infty, -6) \cup (-6, 1) \cup (1, \infty)$ Range: $(-\infty, 0) \cup [0.24, \infty)$

End-Behavior:

$as\ x \rightarrow -\infty, y \rightarrow 0$

$as\ x \rightarrow \infty, y \rightarrow 0$



Minimum @ $(-2.5, 0.24)$
(From Calculator; use for Range)

6.) $f(x) = \frac{x+1}{x^2-1} = \frac{\cancel{(x+1)}}{\cancel{(x+1)}(x-1)} \approx \frac{1}{x-1}$ (with a 'hole' at $x = -1$)

y-intercept: $(0, -1)$ x-int: none

Holes: $(-1, -\frac{1}{2})$

Vertical Asymptotes: $X=1$ Horizontal Asymptotes: $Y=0$

Domain: $(-\infty, -1) \cup (-1, 1) \cup (1, \infty)$ Range: $(-\infty, -\frac{1}{2}) \cup (-\frac{1}{2}, 0) \cup (0, \infty)$

End-Behavior:

$as\ x \rightarrow -\infty, y \rightarrow 0$

$as\ x \rightarrow \infty, y \rightarrow 0$

