

MHF4U_2011: Advanced Functions, Grade 12, University Preparation
Unit 2: Advanced Polynomial and Rational Functions
Activity 4: Rational Functions Part 1

Formative Assignment

1. For each of the following functions, without using graphing technology, state the following properties: domain, range, vertical, and horizontal asymptotes. Remember: use the denominator for the information. Sketch at the end.

a) $y = \frac{1}{(x+1)}$

b) $y = \frac{1}{(x+3)(x-5)}$

c) $y = \frac{1}{(x^2-9)}$

d) $y = \frac{1}{x^2+0.5}$

2. For each of the characteristics listed below, create a function that has those particular features. After you have created your function, check your function using GeoGebra or Graphcalc.

Free Graphing technology If you do not currently have graphing software installed on your computer, please take the time to install some:

GeoGebra: <http://www.geogebra.org/cms/en/download>

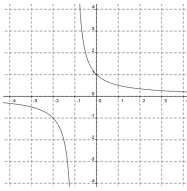
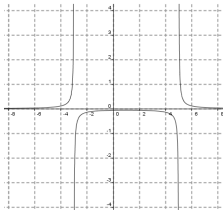
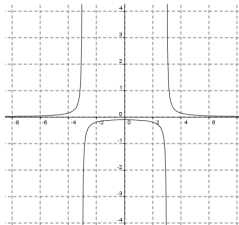
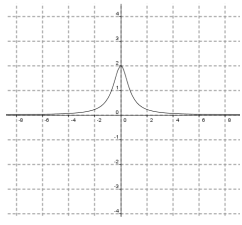
GraphCalc: <http://www.graphcalc.com/download.shtml>

a) a vertical asymptote at $x = 1$ and a horizontal asymptote of $y = 0$.

b) a vertical asymptote of $x = -4$ and $x = 5$ and a horizontal asymptote of $y = 0$.

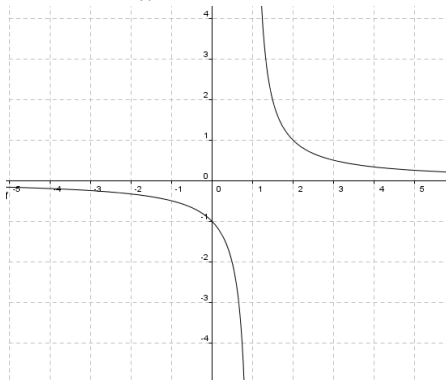
Solutions:

1.

Characteristics	Function: $y = \frac{1}{(x+1)}$	Function: $y = \frac{1}{(x+3)(x-5)}$	Function: $y = \frac{1}{(x^2-9)}$	Function $y = \frac{1}{x^2+0.5}$
Domain	$\{x \in \mathbb{R} \mid x \neq -1\}$	$\{x \in \mathbb{R} \mid x \neq -3, 5\}$	$\{x \in \mathbb{R} \mid x \neq -3, 3\}$	$\{x \in \mathbb{R}\}$
Range	$\{y \in \mathbb{R} \mid y \neq 0\}$	$\{y \in \mathbb{R} \mid y \neq 0\}$	$\{y \in \mathbb{R} \mid y \neq 0\}$	$\{y \in \mathbb{R} \mid y \neq 0\}$
Vertical asymptote(s)	$x = -1$	$x = -3$ and $x = 5$	$x = -3$ and $x = 3$	none
Horizontal asymptote(s)	$y = 0$	$y = 0$	$y = 0$	$y = 0$
Sketches				

2.

a) $f(x) = \frac{1}{x-1}$ there are other answers, too!



b) $f(x) = \frac{1}{(x+4)(x-5)}$

