MHF 4UI
Unit 2
Rational Functions

Day 5
Graphing Rational Functions

MHF 4UI

Rational Functions

Definition: A rational function has the form $h(x) = \frac{f(x)}{g(x)}$, where

$f(x)$ and $g(x)$ are polynomial functions and $g(x) \neq 0$.

The domain of a rational function is $x \in R$, except for the values where g(x) = 0.

For each of the following functions, determine if possible and then graph:

a) the x and y intercepts.
b) the domain.
c) the equations of the vertical asymptotes.
d) the equations of the horizontal asymptotes.
e) the nature of the function about the asymptotes…i.e. a limit test.
f) if the curve crosses the horizontal asymptote, determine the point of intersection.
g) sketch the graph.

a) $f(x) = \frac{7}{x+2}$ b) $g(x) = \frac{x}{x^2 - 3x - 4}$ c) $h(x) = \frac{2x^2 + x - 3}{x^2 - 4}$

d) $f(x) = \frac{x+2}{x^2 - 2x}$ e) $g(x) = \frac{2+x}{x-7}$ f) $f(x) = \frac{x+3}{x^2 - 4}$

g) $g(x) = \frac{x-2}{x^2 + 5x + 6}$ h) $y = \frac{2x-3}{5-x}$ i) $f(x) = \frac{2x+1}{x^2 - 4x - 5}$

j) $g(x) = \frac{2x^2 - 5x}{x^2 - 1}$ k) $f(x) = \frac{10}{x^2 + 4}$ l) $h(x) = \frac{x^2 - 9}{x^3 + 4x^2 - x - 4}$

m) $f(x) = \frac{x^2}{x^3 - 2x^2 - 5x + 6}$ n) $h(x) = \frac{x^2}{x^3 - 2x^2 - x + 2}$ o) $f(x) = \frac{x^2-4}{x+3}$

p) $f(x) = \frac{x^2-4x-5}{2x+1}$ q) $f(x) = \frac{x^2-2x+1}{x^2-x}$ r) $f(x) = \frac{x^3-x^2-4x+4}{x^2-x}$

** Note: a), c), o) and q were done as examples in your note.

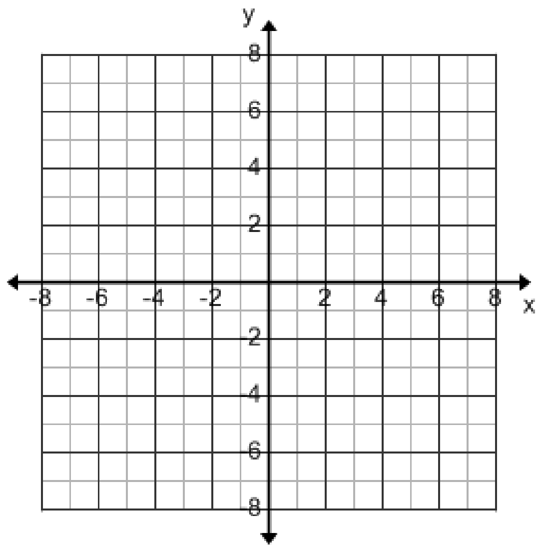
Example 1: Sketch the Graph of the following:

a) $f(x) = \dfrac{7}{x+2}$

a) the x and y intercepts.

b) the domain.

c) the equation(s) of the vertical asymptotes and how the function behaves near the asymptote(s).

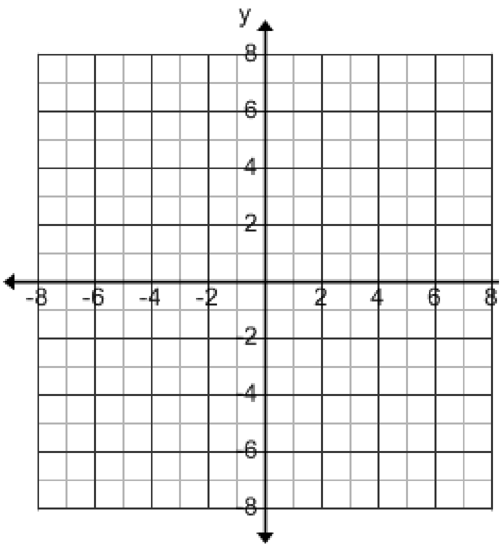


d) the equations of the horizontal asymptotes and how the function behaves near the asymptote.

e) if the curve crosses the horizontal or oblique asymptote, determine the point of intersection.

f) sketch the graph

c) $h(x)=\dfrac{2x^2+x-3}{x^2-4}$



a) the x and y intercepts.

b) the domain.

c) the equation(s) of the vertical asymptotes and how the function behaves near the asymptote(s).

d) the equations of the horizontal asymptotes and how the function behaves near the asymptote.

e) if the curve crosses the horizontal or oblique asymptote, determine the point of intersection.

f) sketch the graph