Section 2.6

Rational Function

A rational function can be written in the form $f(x) = \frac{N(x)}{D(x)}$, where $N(x)$ and $D(x)$ are polynomials and $D(x)$ is not a zero polynomial.

Horizontal and Vertical Asymptote

The line $x = a$ is a vertical asymptote of the graph of f if $f(x) \to \infty$ or $f(x) \to -\infty$ as $x \to a$, either from the right or from the left.

The line $y = b$ is a horizontal asymptote of the graph of f if $f(x) \to b$ as $x \to \infty$ or $x \to -\infty$.

Problem 1. State the domain of the function, identify all intercepts, find any vertical and horizontal asymptotes, and sketch the graph of the rational function.

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

b) $g(x) = \frac{2x-4}{x+3}$

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

d) $m(x) = \frac{x^2-x-20}{x^2+x-2}$

e) $k(x) = \frac{x^2-9}{x^2-4x+3}$

Homework: Read section 2.6, do #11, 15, 21, 27, 29, 39, 57