

2.6 Graphs of Rational Functions

ESSENTIAL QUESTION

What characteristics of a function should we consider when graphing it without a calculator?

Definition of Rational Function

Let $f(x)$ and $g(x)$ be polynomial functions.

Then $y = \frac{f(x)}{g(x)}$, $g(x) \neq 0$, is a rational function.

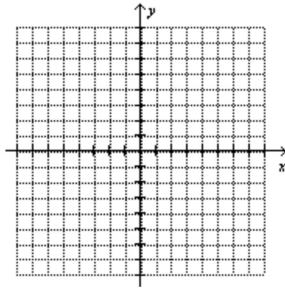
To graph rational functions without a calculator we must look for important characteristics of the graph.

1. Horizontal asymptotes
2. Vertical asymptotes and/or holes (factor BOTH numerator & denominator)
3. Slant asymptotes (These only occur when the degree of the numerator is exactly one more than the degree of the denominator. Use long division to find.)
4. End behavior (hug asymptotes)
5. x-intercepts (set $y = 0$)
6. y-intercepts (set $x = 0$)
7. If you think you need more info, plug in a few x-values and plot more points.

examples...

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

1. horizontal asymptotes
2. vertical asymptotes/holes
3. slant asymptotes
4. end behavior
5. x-intercepts
6. y-intercepts



2. Graph $y = \frac{x^2 - x - 6}{x + 1}$

1. horizontal asymptotes
2. vertical asymptotes/holes
3. slant asymptotes
4. end behavior
5. x-intercepts
6. y-intercepts

