

Rational Polynomials: Graphing and Asymptotes

Find the intercepts, if there are any.

Step 1: Set the numerator to 0 to solve for horizontal intercepts.

Step 2: Set the x to 0 to solve for vertical intercept.

Step 3: Set the denominator to 0 to solve for vertical asymptotes.

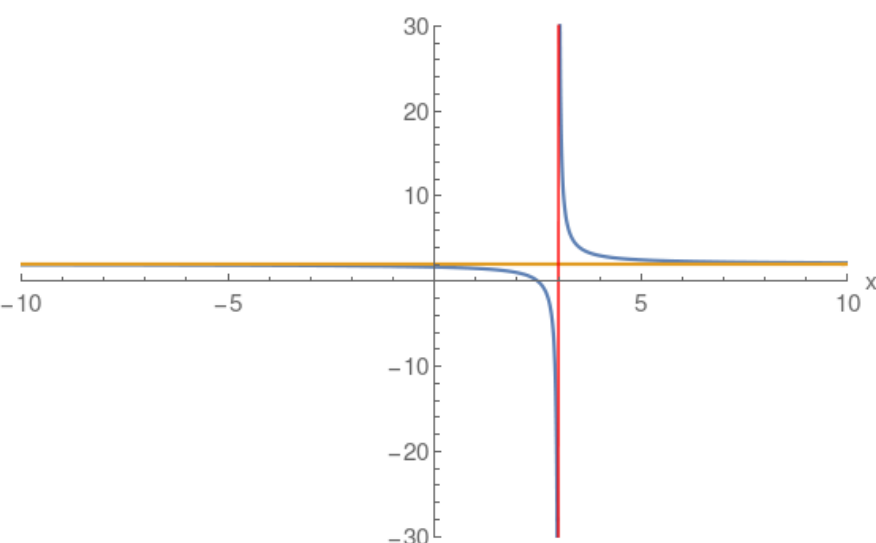
Step 4: Perform a long division to find the quotient which specifies the oblique asymptote.

Note: Blue curve the actual Rational function.
Red and Gold asymptotes.

Example: Horizontal Asymptote

$$\frac{2x-5}{x-3}$$

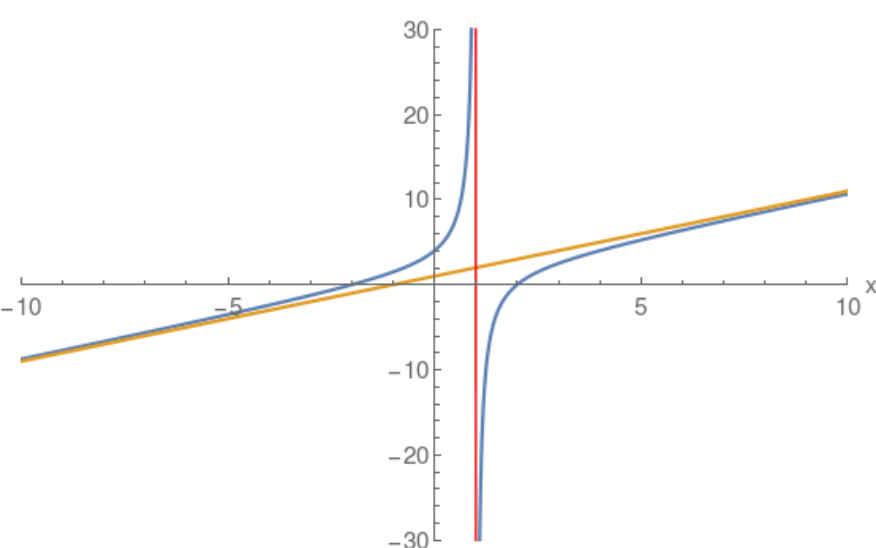
$$\begin{array}{r} + (2) \\ \hline x-3 \quad (2)x + (-5) \\ (2x) + (-6) \\ + (1) \end{array}$$



Example: Oblique Linear Asymptote

$$\frac{(x-2)(x+2)}{x-1}$$

$$\begin{array}{r} + (x) + (1) \\ \hline x-1 \quad (1)x^2 + (-4) \\ (x^2) + (-x) \\ + (1)x + (-4) \\ + (x) + (-1) \\ + (-3) \end{array}$$



Example: Multiple Vertical Asymptotes

$$\frac{x-1}{(x-3)(x+3)}$$

$$\begin{array}{r} + (0) \\ \hline (x) + (-1) \end{array}$$

