

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.

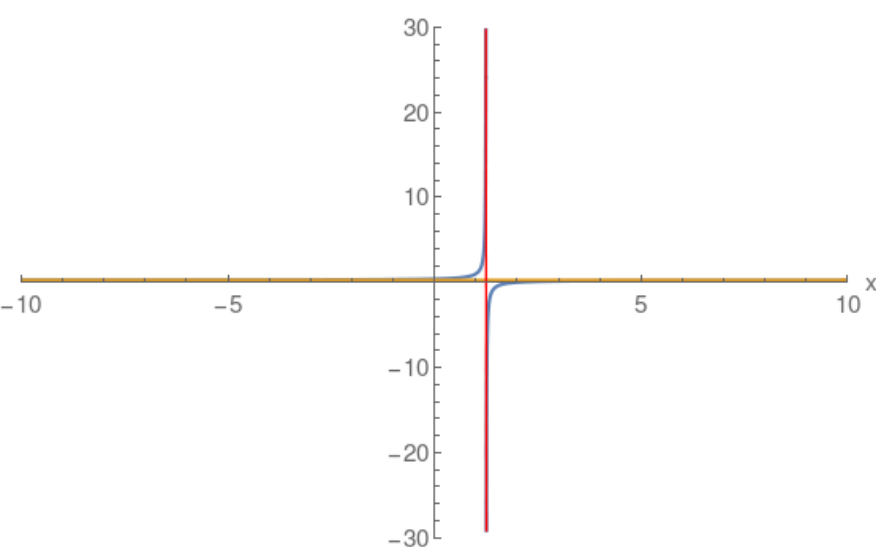
Note: Blue curve the actual Rational function.

Red and Gold asymptotes.

Example: Horizontal Asymptote

$$\frac{x-2}{4x-5}$$

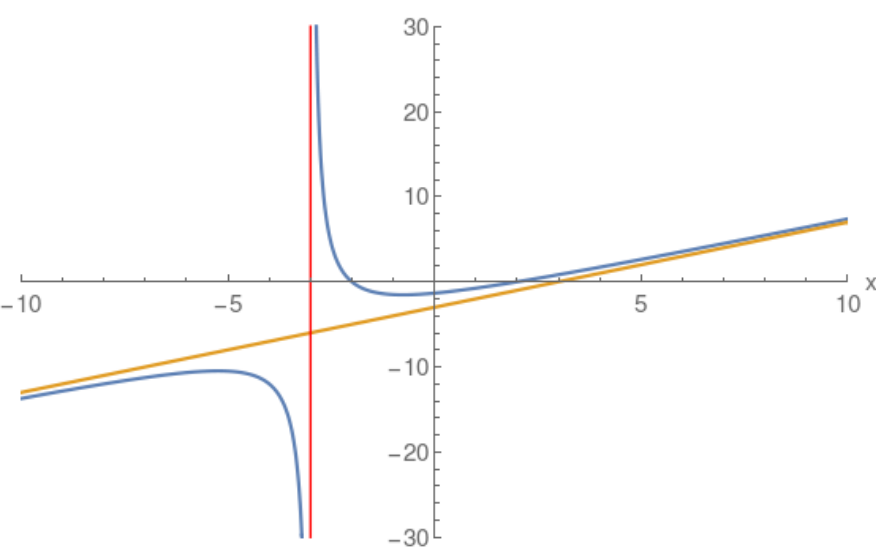
$$\begin{array}{r} + \left(\frac{1}{4} \right) \\ \hline 4x-5 \quad (1)x + (-2) \\ (x) + \left(-\frac{5}{4} \right) \\ + \left(-\frac{3}{4} \right) \end{array}$$



Example: Oblique Linear Asymptote

$$\frac{(x-2)(x+2)}{x+3}$$

$$\begin{array}{r} + (x) + (-3) \\ \hline x+3 \quad (1)x^2 + (-4) \\ (x^2) + (3x) \\ + (-3)x + (-4) \\ + (-3x) + (-9) \\ + (5) \end{array}$$



Example: Multiple Vertical Asymptotes

$$\frac{x-3}{(x+2)(x+3)}$$

$$\begin{array}{r} + (0) \\ \hline (x) + (-3) \end{array}$$

