

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.

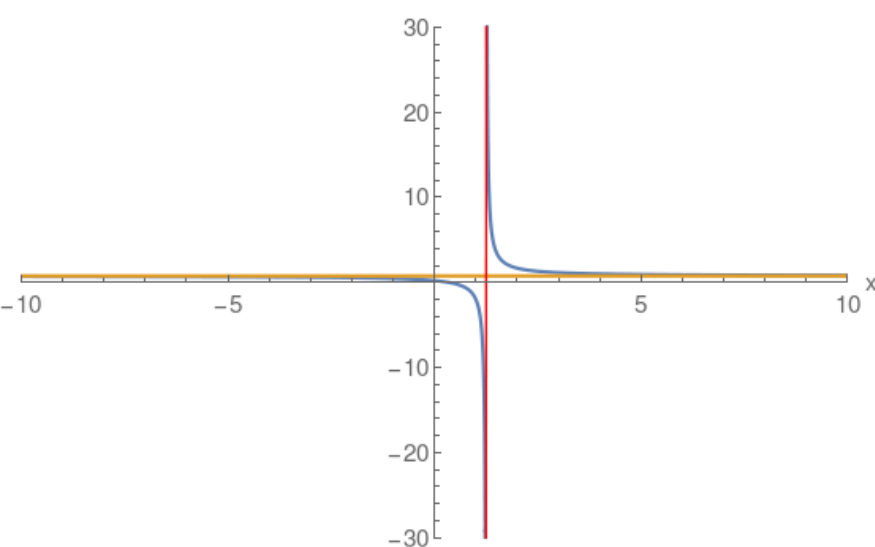
Note: Blue curve the actual Rational function.

Red and Gold asymptotes.

Example: Horizontal Asymptote

$$\frac{3x-1}{4x-5}$$

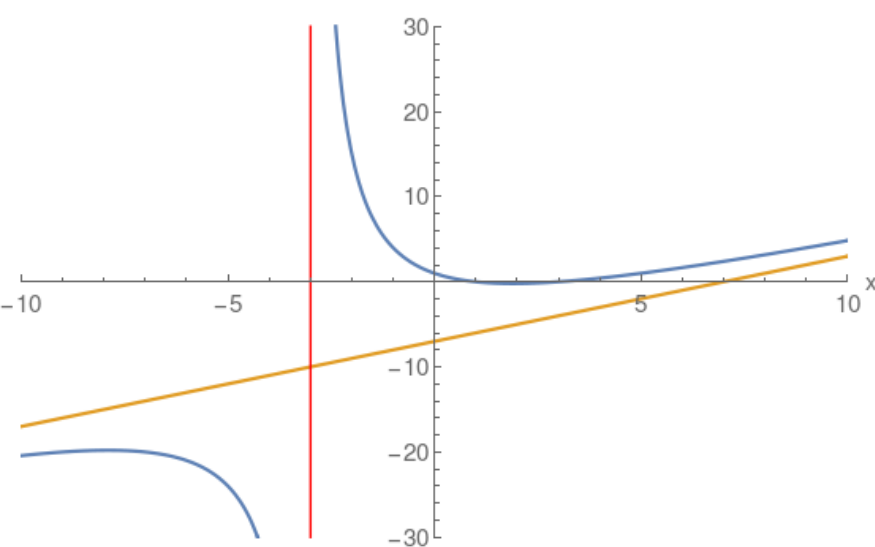
$$\begin{array}{r} + \left(\frac{3}{4} \right) \\ \hline 4x - 5 \quad (3)x + (-1) \\ \quad (3x) + \left(-\frac{15}{4} \right) \\ \quad \quad + \left(\frac{11}{4} \right) \end{array}$$



Example: Oblique Linear Asymptote

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

$$\begin{array}{r} + \left(x \right) + \left(-7 \right) \\ \hline x + 3 \quad (1)x^2 + (-4)x + (3) \\ \quad (x^2) + (3x) \\ \quad \quad + (-7)x + (3) \\ \quad \quad + (-7x) + (-21) \\ \quad \quad \quad + (24) \end{array}$$



Example: Multiple Vertical Asymptotes

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

$$\begin{array}{r} + \left(0 \right) \\ \hline (x) + (-2) \end{array}$$

