

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.

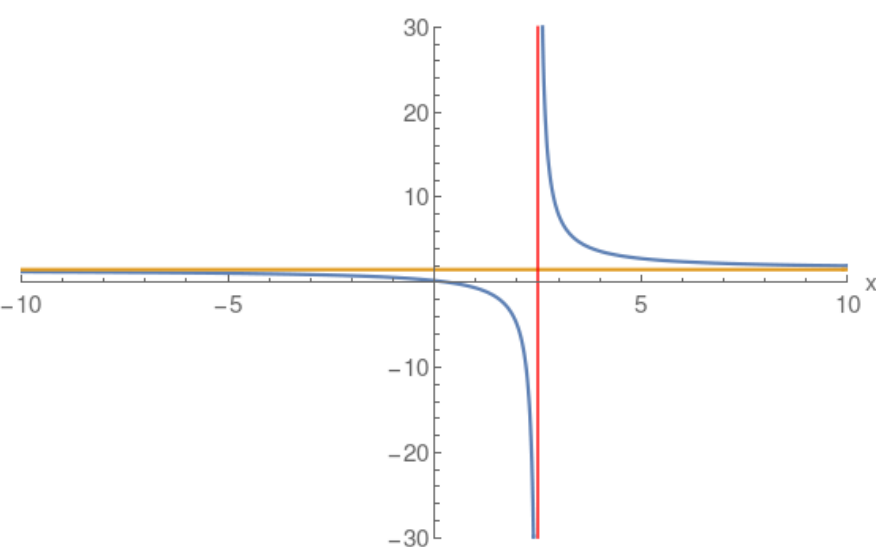
Note: Blue curve the actual Rational function.

Red and Gold asymptotes.

Example: Horizontal Asymptote

$$\frac{3x-1}{2x-5}$$

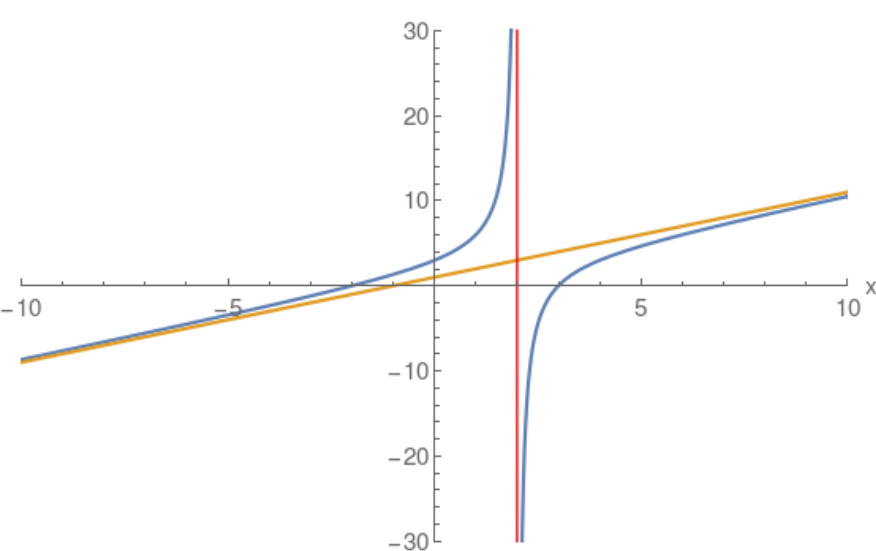
$$\begin{array}{r} + \left(\frac{3}{2}\right) \\ \hline 2x-5 \quad (3)x \quad + (-1) \\ \quad (3x) \quad + \left(-\frac{15}{2}\right) \\ \quad + \left(\frac{13}{2}\right) \end{array}$$



Example: Oblique Linear Asymptote

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

$$\begin{array}{r} + \left(x\right) \quad + \left(1\right) \\ \hline x-2 \quad (1)x^2 \quad + (-1)x \quad + (-6) \\ \quad (x^2) \quad + (-2x) \\ \quad + (1)x \quad + (-6) \\ \quad + (x) \quad + (-2) \\ \quad + (-4) \end{array}$$



Example: Multiple Vertical Asymptotes

$$\frac{x+2}{(x-1)(x+3)}$$

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

