

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.

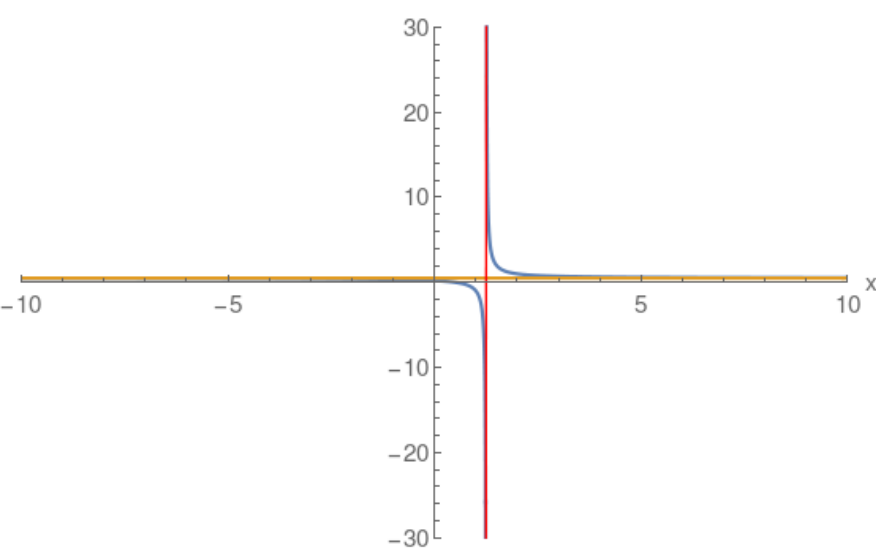
Note: Blue curve the actual Rational function.

Red and Gold asymptotes.

Example: Horizontal Asymptote

$$\frac{2x-1}{4x-5}$$

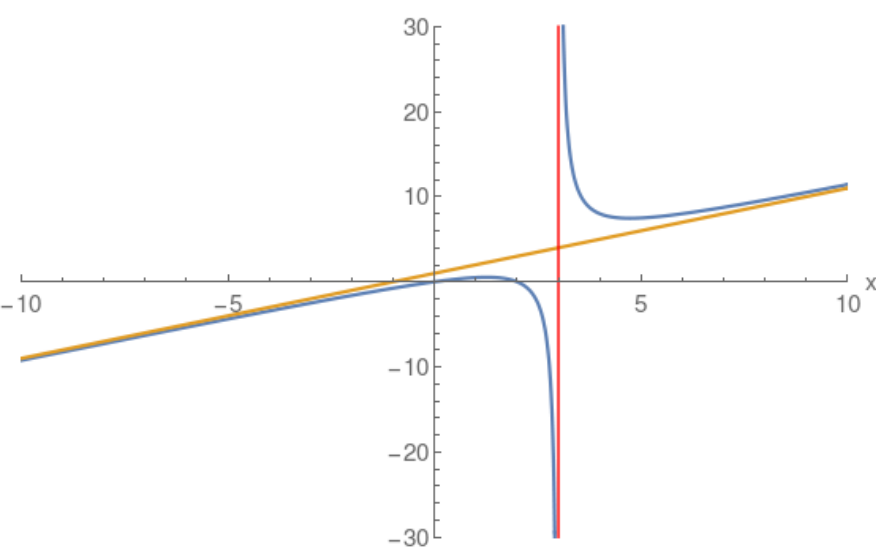
$$\begin{array}{r} + \left(\frac{1}{2}\right) \\ \hline 4x-5 \quad (2)x \quad + (-1) \\ \quad (2x) \quad + \left(-\frac{5}{2}\right) \\ \quad + \left(\frac{3}{2}\right) \end{array}$$



Example: Oblique Linear Asymptote

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

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



Example: Multiple Vertical Asymptotes

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

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

