

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.

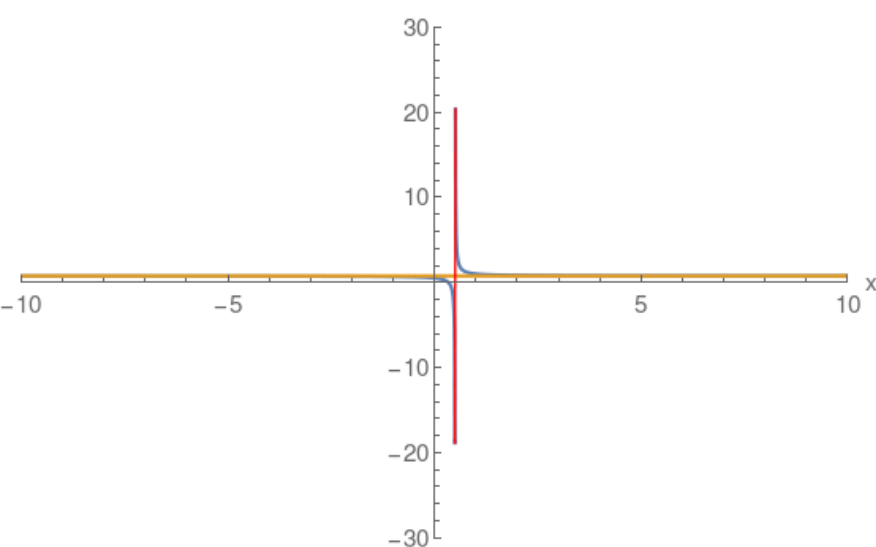
Note: Blue curve the actual Rational function.

Red and Gold asymptotes.

Example: Horizontal Asymptote

$$\frac{3x-1}{4x-2}$$

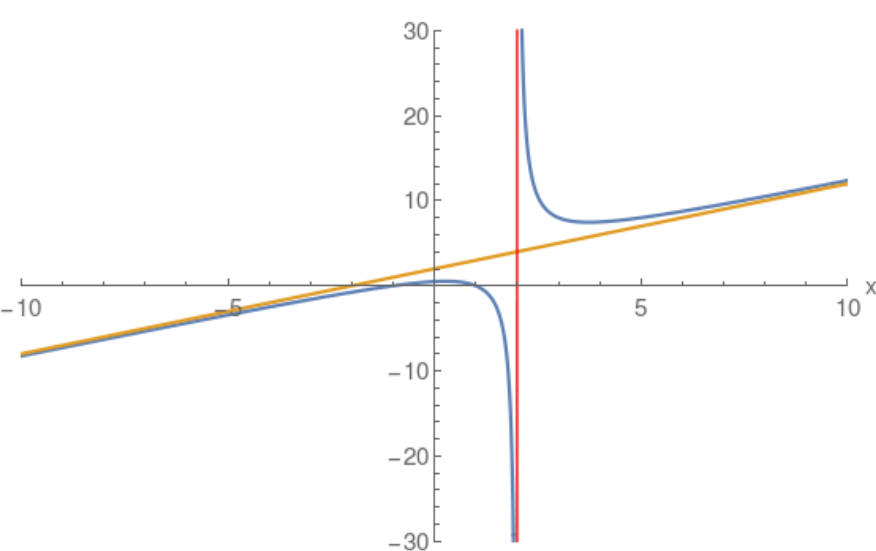
$$\begin{array}{r} + \left(\frac{3}{4}\right) \\ 4x-2 \overline{) (3)x + (-1)} \\ \underline{(3)x} \\ + \left(-\frac{3}{2}\right) \\ + \left(\frac{1}{2}\right) \end{array}$$



Example: Oblique Linear Asymptote

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

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



Example: Multiple Vertical Asymptotes

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

$$\begin{array}{r} + (0) \\ (x-2) \overline{) (x+3)} \\ \underline{(x)} \\ + (3) \end{array}$$

