

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.

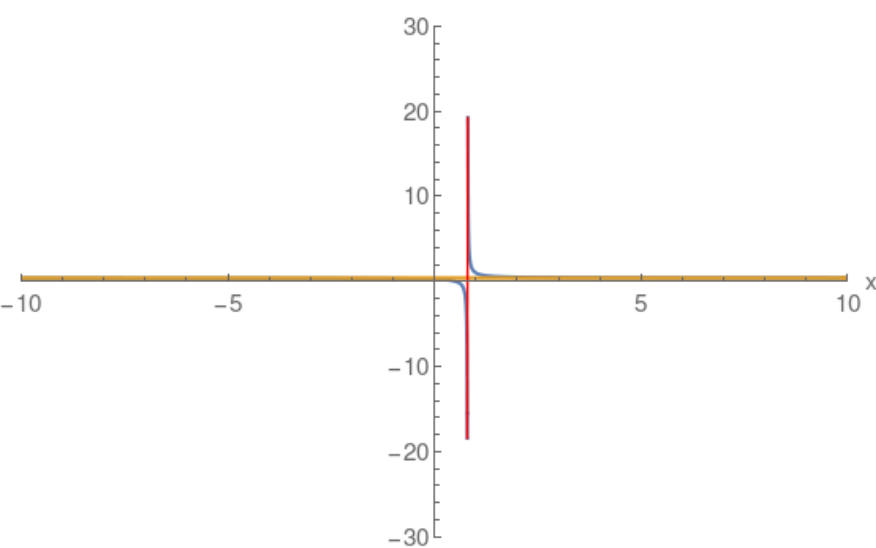
Note: Blue curve the actual Rational function.

Red and Gold asymptotes.

Example: Horizontal Asymptote

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

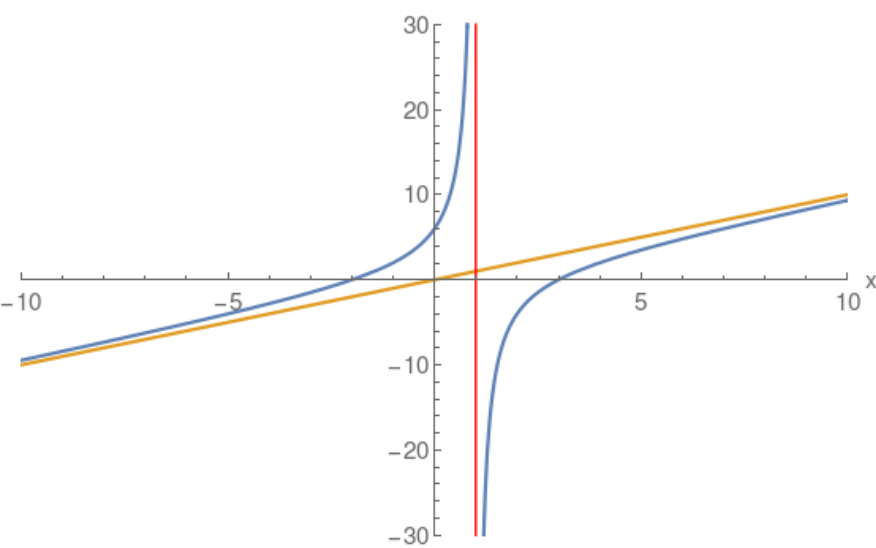
$$\begin{array}{r} + \left(\frac{2}{5} \right) \\ \hline \boxed{5x-4} \quad (2)x \quad + (-1) \\ \quad \left(\frac{2x}{5} \right) + \left(-\frac{8}{5} \right) \\ \quad \quad + \left(\frac{3}{5} \right) \end{array}$$



Example: Oblique Linear Asymptote

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

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



Example: Multiple Vertical Asymptotes

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

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

