

# 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.

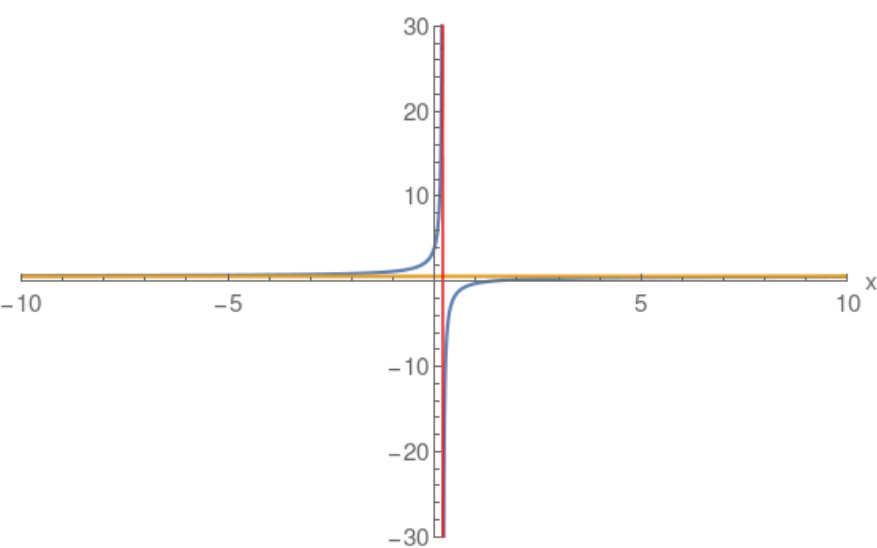
**Note:** Blue curve the actual Rational function.

**Red and Gold asymptotes.**

## Example: Horizontal Asymptote

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

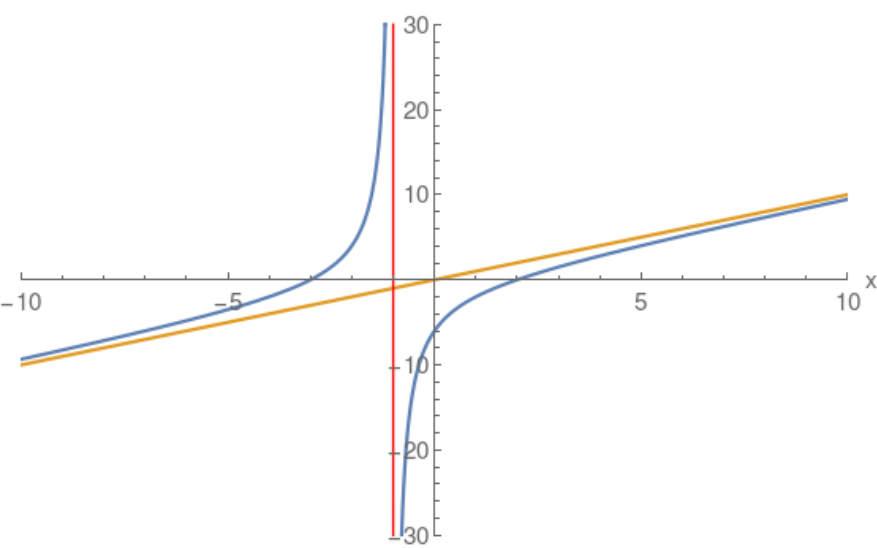
$$\begin{array}{r} + \left( \frac{3}{5} \right) \\ \hline 5x - 1 \quad (3)x \quad + (-4) \\ \hline (3x) \quad + \left( -\frac{3}{5} \right) \\ \hline + \left( -\frac{17}{5} \right) \end{array}$$



## Example: Oblique Linear Asymptote

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

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



## Example: Multiple Vertical Asymptotes

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

$$\begin{array}{r} + \left( 0 \right) \\ \hline (x) \quad + \left( 1 \right) \end{array}$$

