

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.

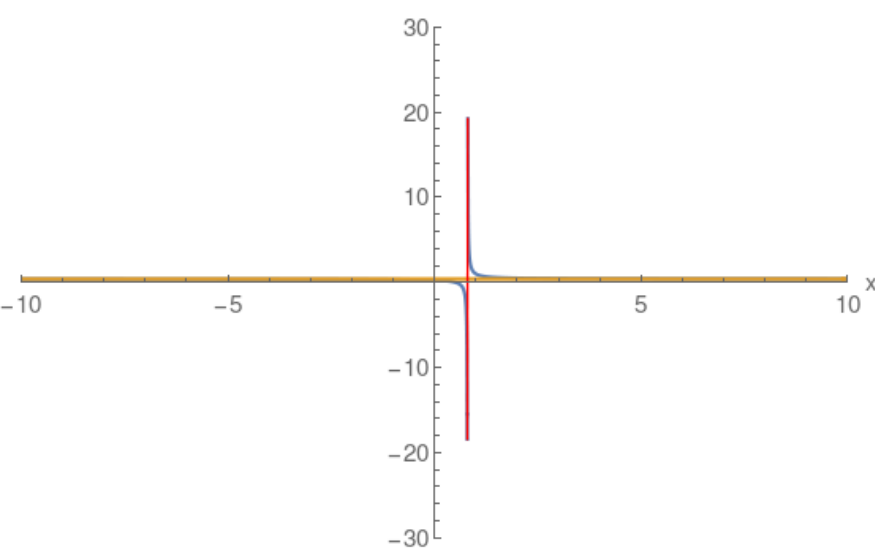
Step 4: Perform a long division to find the quotient which specifies the oblique asymptote.

Note: Blue curve the actual Rational function.
Red and Gold asymptotes.

Example: Horizontal Asymptote

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

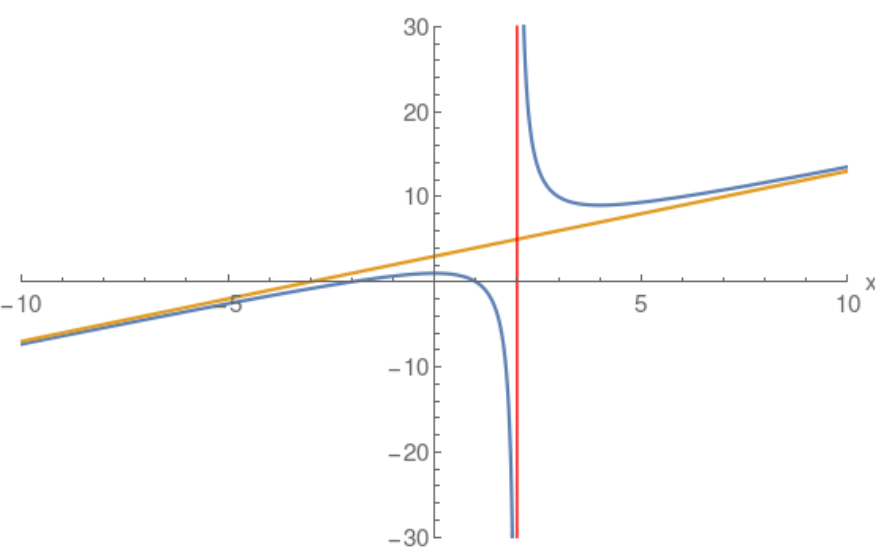
$$\begin{array}{r} + \left(\frac{2}{5}\right) \\ \hline 5x-4 \quad (2)x \quad + (-1) \\ \quad (2x) \quad + \left(-\frac{8}{5}\right) \\ \quad + \left(\frac{3}{5}\right) \end{array}$$



Example: Oblique Linear Asymptote

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

$$\begin{array}{r} + \left(x\right) \quad + \left(3\right) \\ \hline x-2 \quad (1)x^2 \quad + (1)x \quad + (-2) \\ \quad (x^2) \quad + \quad (-2x) \\ \quad + (3)x \quad + (-2) \\ \quad + (3x) \quad + \quad (-6) \\ \quad + (4) \end{array}$$



Example: Multiple Vertical Asymptotes

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

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

