

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.

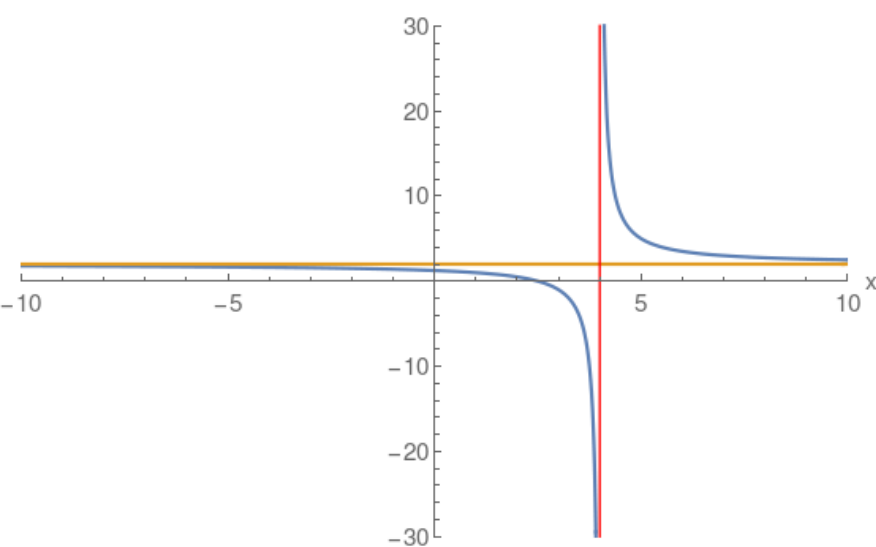
Step 4: Perform a long division to find the quotient which specifies the oblique asymptote.

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

Example: Horizontal Asymptote

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

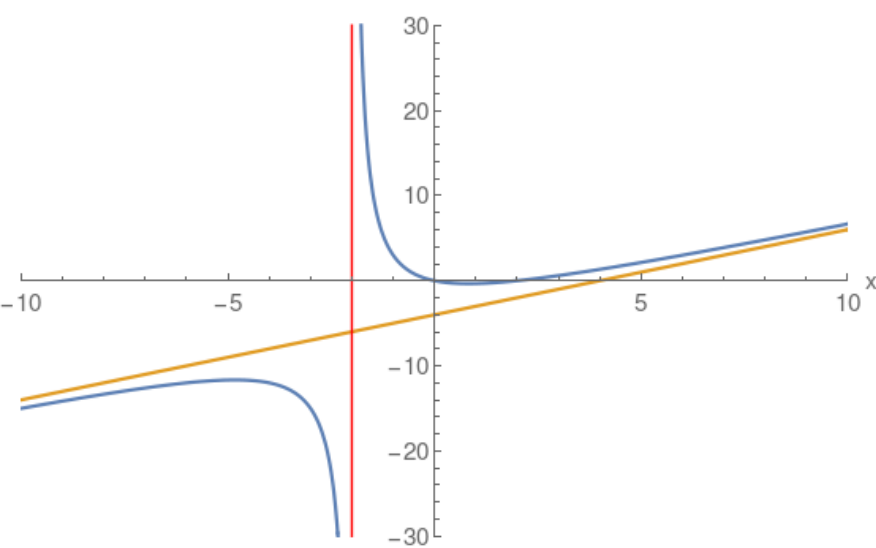
$$\begin{array}{r} + (\boxed{2}) \\ \hline \boxed{x-4} \quad (2)x + (-5) \\ (\boxed{2x}) + (\boxed{-8}) \\ + (\boxed{3}) \end{array}$$



Example: Oblique Linear Asymptote

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

$$\begin{array}{r} + (\boxed{x}) + (\boxed{-4}) \\ \hline \boxed{x+2} \quad (1)x^2 + (-2)x \\ (\boxed{x^2}) + (\boxed{2x}) \\ + (-4)x \\ + (\boxed{-4x}) + (\boxed{-8}) \\ + (\boxed{8}) \end{array}$$



Example: Multiple Vertical Asymptotes

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

$$\begin{array}{r} + (\boxed{0}) \\ \hline (\boxed{x}) + (\boxed{3}) \end{array}$$

