

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.

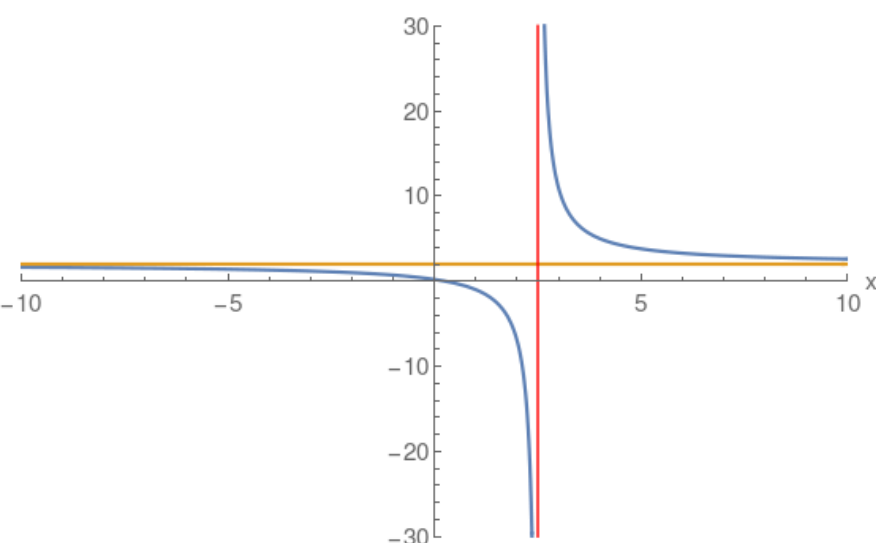
Step 4: Perform a long division to find the quotient which specifies the oblique asymptote.

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

Example: Horizontal Asymptote

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

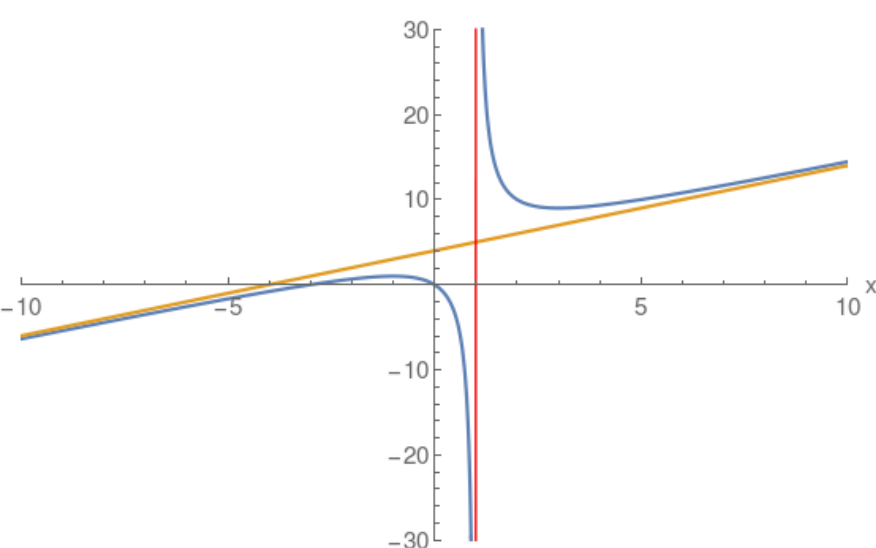
$$\begin{array}{r} + (2) \\ \hline 2x-5 \quad (4)x \quad + (-1) \\ (4x) \quad + (-10) \\ + (9) \end{array}$$



Example: Oblique Linear Asymptote

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

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



Example: Multiple Vertical Asymptotes

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

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

