

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.

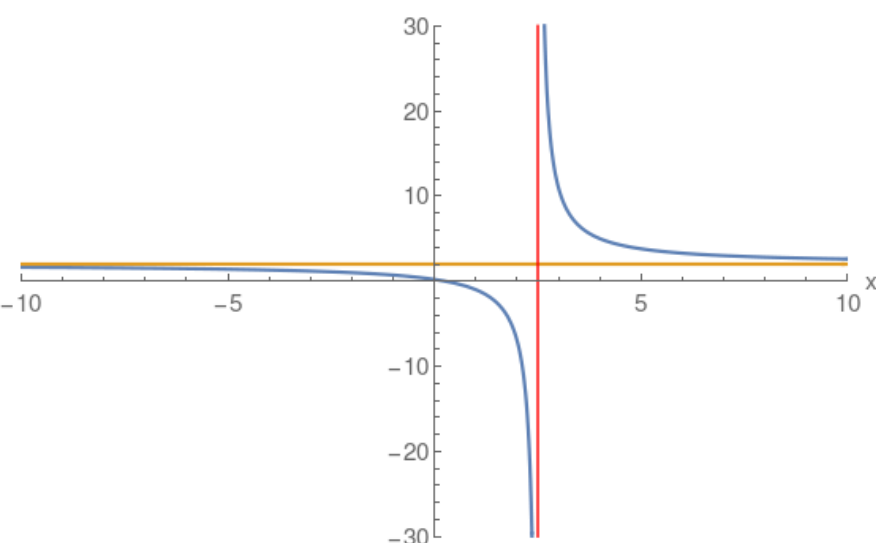
Step 4: Perform a long division to find the quotient which specifies the oblique asymptote.

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

Example: Horizontal Asymptote

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

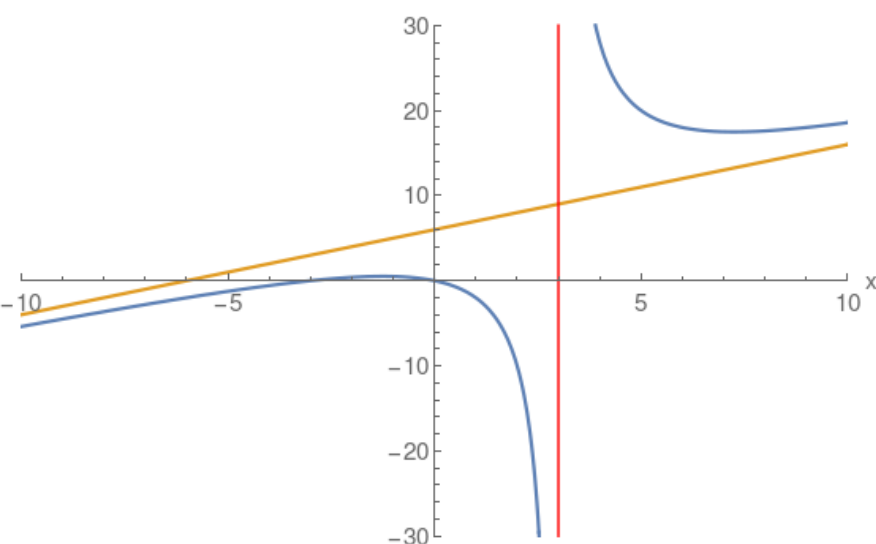
$$\begin{array}{r} + (2) \\ \hline 2x-5 \quad (4)x + (-1) \\ (4x) + (-10) \\ + (9) \end{array}$$



Example: Oblique Linear Asymptote

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

$$\begin{array}{r} + (x) + (6) \\ \hline x-3 \quad (1)x^2 + (3)x \\ (x^2) + (-3x) \\ + (6)x \\ + (6x) + (-18) \\ + (18) \end{array}$$



Example: Multiple Vertical Asymptotes

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

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

