

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.

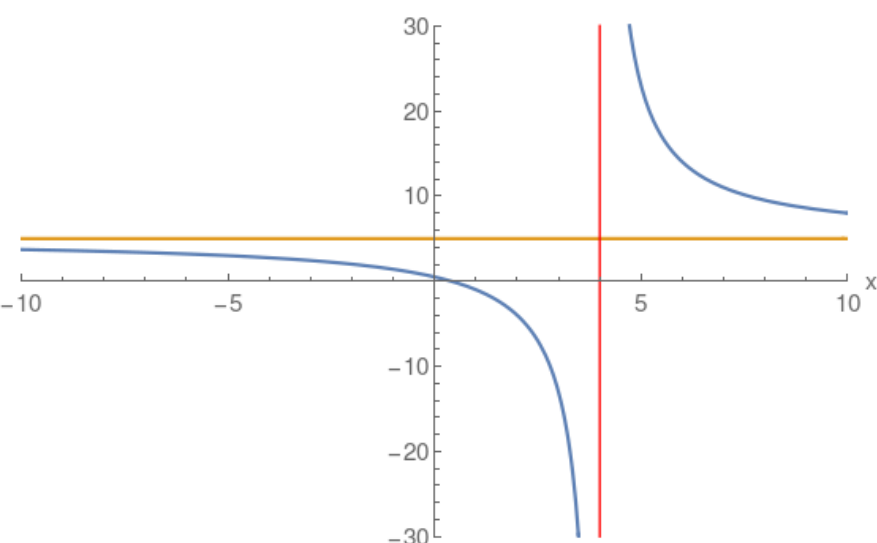
Step 4: Perform a long division to find the quotient which specifies the oblique asymptote.

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

Example: Horizontal Asymptote

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

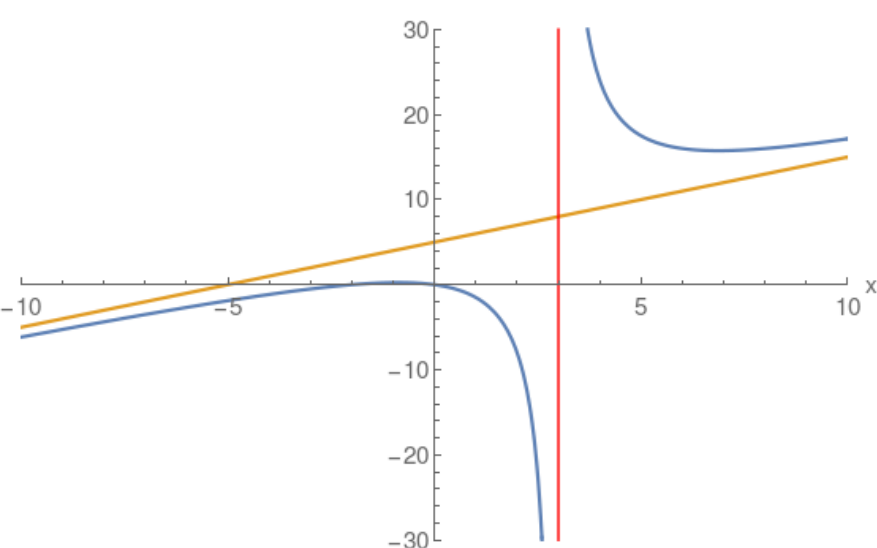
$$\begin{array}{r} + (5) \\ \hline x-4 \quad (5)x + (-2) \\ (5x) + (-20) \\ + (18) \end{array}$$



Example: Oblique Linear Asymptote

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

$$\begin{array}{r} + (x) + (5) \\ \hline x-3 \quad (1)x^2 + (2)x \\ (x^2) + (-3x) \\ + (5)x \\ + (5x) + (-15) \\ + (15) \end{array}$$



Example: Multiple Vertical Asymptotes

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

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

