

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.

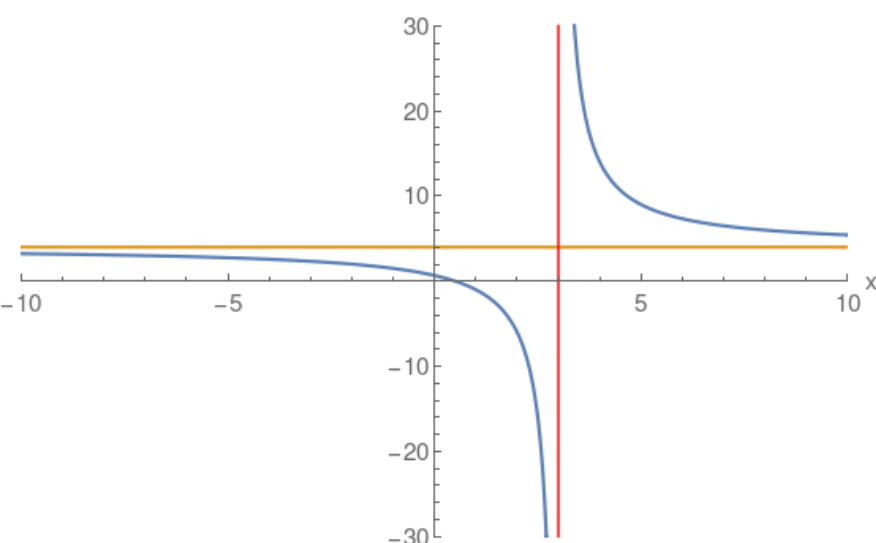
Step 4: Perform a long division to find the quotient which specifies the oblique asymptote.

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

Example: Horizontal Asymptote

$$\frac{4x-2}{x-3}$$

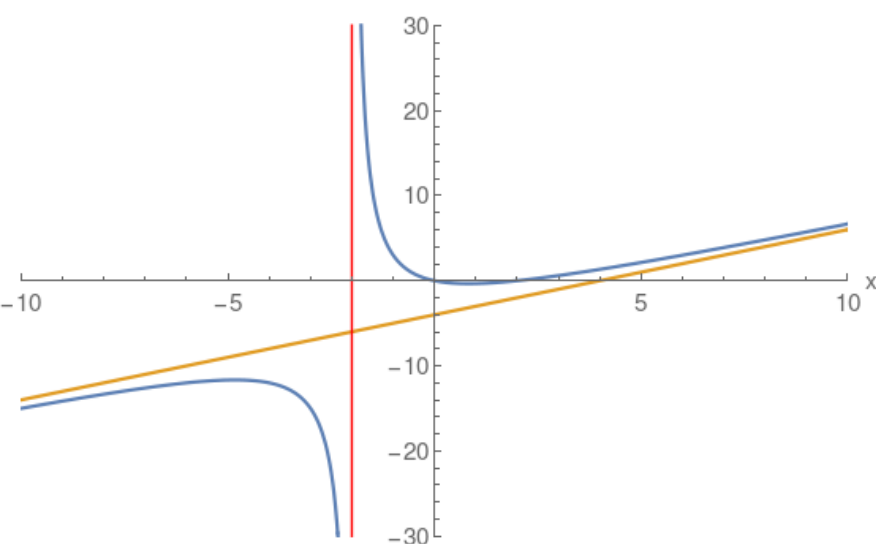
$$\begin{array}{r} + (4) \\ \hline x-3 \quad (4)x + (-2) \\ (4x) + (-12) \\ + (10) \end{array}$$



Example: Oblique Linear Asymptote

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

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



Example: Multiple Vertical Asymptotes

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

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

