

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.

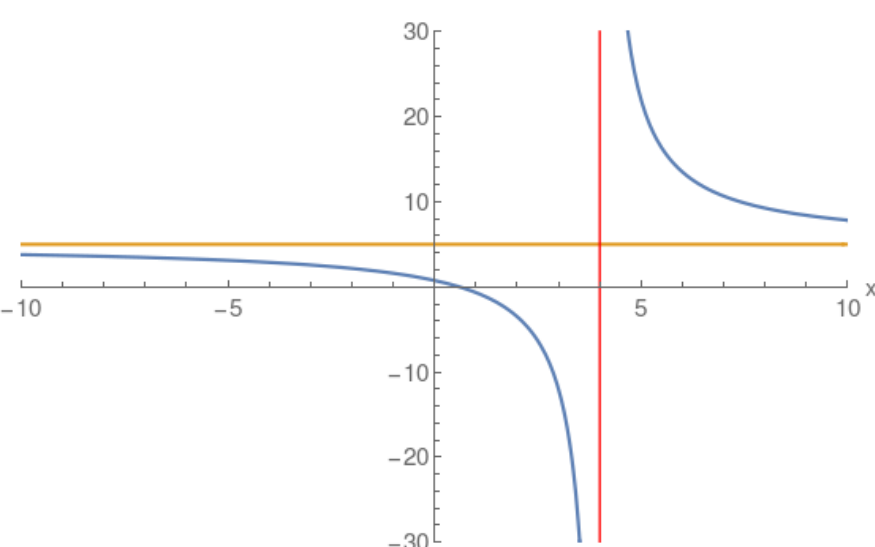
Step 3: Set the denominator to 0 to solve for vertical asymptotes.

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.

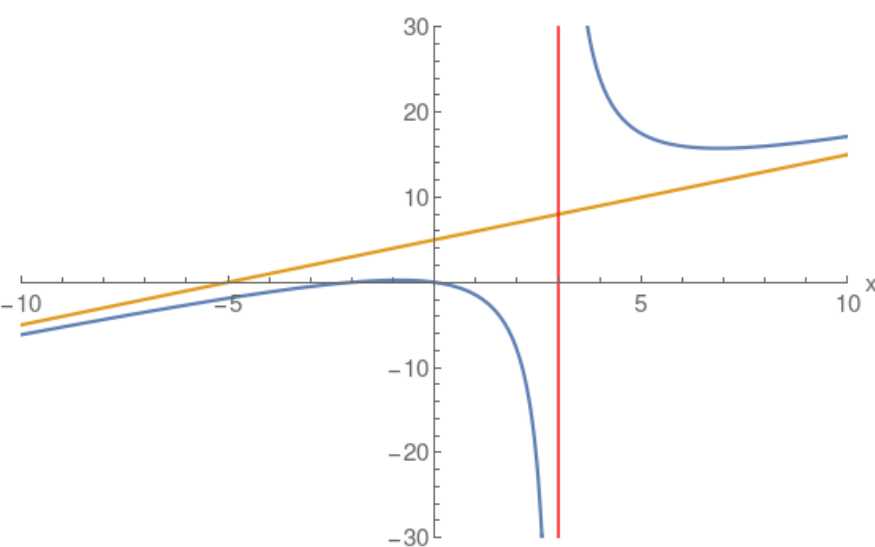
Example: Horizontal Asymptote

$$\begin{array}{r} \frac{5x-3}{x-4} \\ x-4 \overline{) (5)x + (-3)} \\ \underline{(5)x} \\ (-3) \\ \underline{(-20)} \\ 17 \end{array}$$



Example: Oblique Linear Asymptote

$$\begin{array}{r} \frac{x(x+2)}{x-3} \\ x-3 \overline{) (1)x^2 + (2)x} \\ \underline{(1)x^2} \\ (-3)x \\ \underline{(-3)x} \\ (5)x \\ \underline{(5)x} \\ (-15) \\ \underline{(-15)} \\ 15 \end{array}$$



Example: Multiple Vertical Asymptotes

$$\begin{array}{r} \frac{x}{(x-2)(x+3)} \\ (x-2)(x+3) \overline{) x} \\ \underline{(x)} \\ 0 \end{array}$$

