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

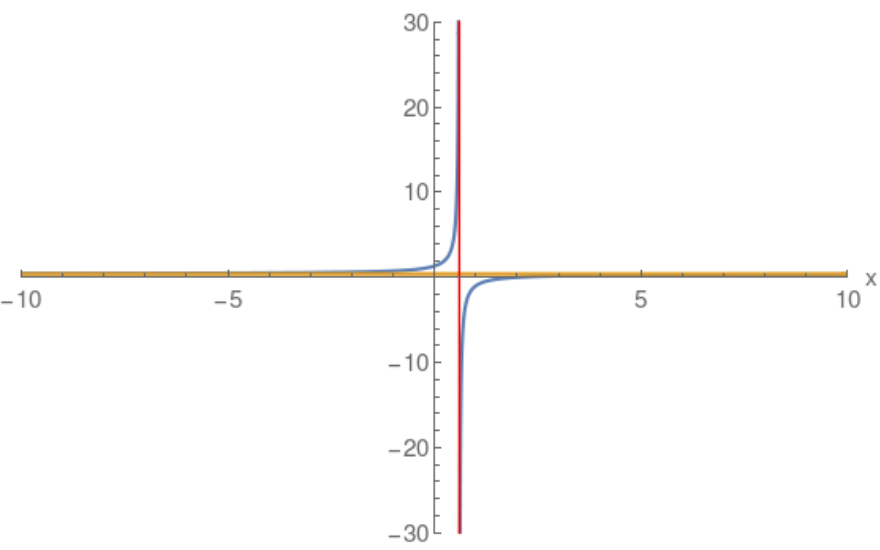
$$\frac{2x-4}{5x-3}$$

$$+\left(\boxed{\frac{2}{5}}\right)$$

$$\boxed{5x-3}\quad (2)x \quad +(-4)$$

$$\left(\boxed{2x}\right) \quad +\left(\boxed{-\frac{6}{5}}\right)$$

$$+\left(\boxed{-\frac{14}{5}}\right)$$



Example: Oblique Linear Asymptote

$$\frac{(x-2)(x-1)}{x}$$

$$+\left(\boxed{x}\right) \qquad +\left(\boxed{-3}\right)$$

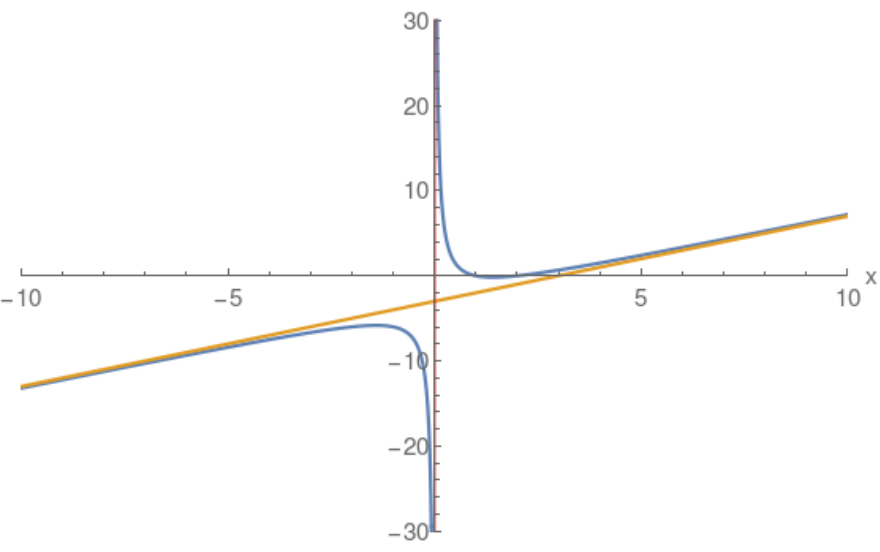
$$\boxed{x} \quad (1)x^2 \quad +(-3)x \quad +(2)$$

$$\left(\boxed{x^2}\right)$$

$$+(-3)x \quad +(2)$$

$$+\left(\boxed{-3x}\right)$$

$$+\left(\boxed{2}\right)$$



Example: Multiple Vertical Asymptotes

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

$$+\left(\boxed{0}\right)$$

$$\left(\boxed{x}\right) \quad +\left(\boxed{1}\right)$$