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

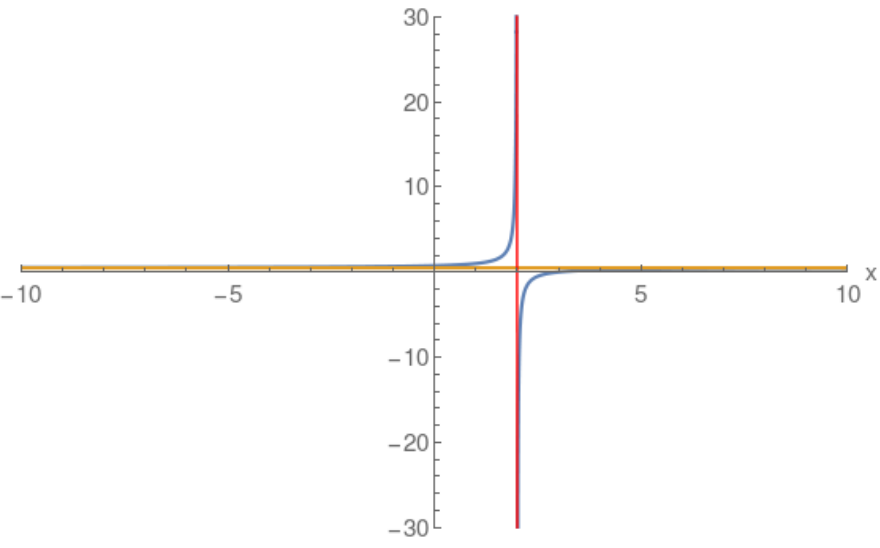
$$\frac{x-3}{2x-4}$$

$$+\left(\boxed{\frac{1}{2}}\right)$$

$$\boxed{2x-4} \quad (1)\,x + (-3)$$

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

$$+\left(\boxed{-1}\right)$$



Example: Oblique Linear Asymptote

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

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

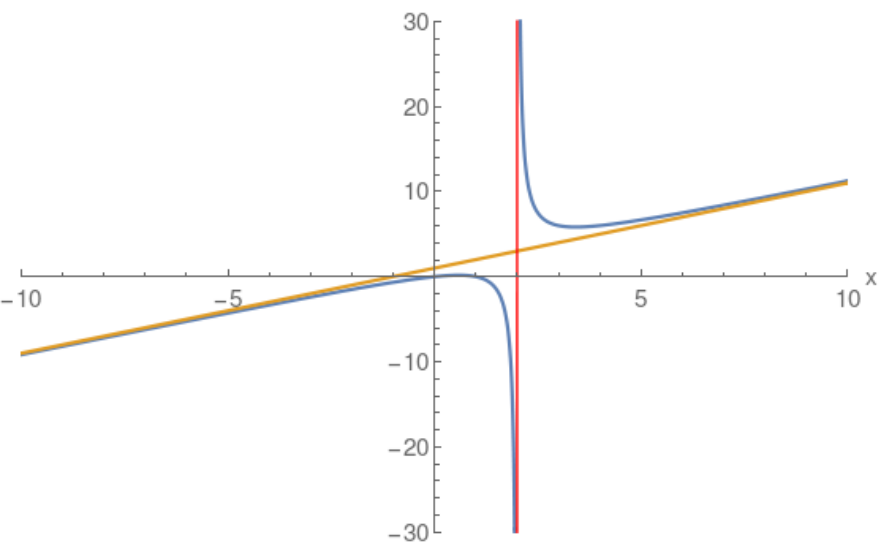
$$\boxed{x-2} \quad (1)\,x^2 + (-1)\,x$$

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

$$+(1)\,x$$

$$+\left(\boxed{x}\right) \qquad +\left(\boxed{-2}\right)$$

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



Example: Multiple Vertical Asymptotes

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

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

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