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

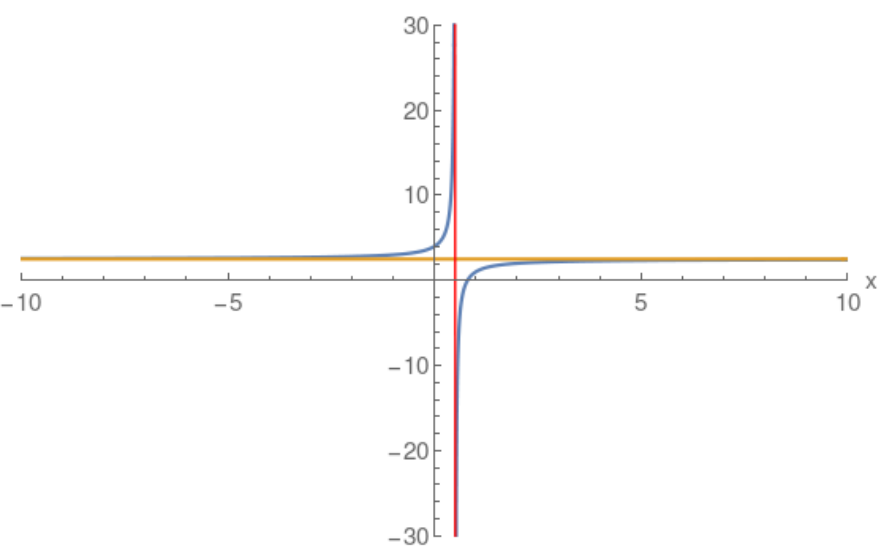
$$\frac{5x-4}{2x-1}$$

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

$$2x-1 \quad (5)x \quad +(-4)$$

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

$$+\left(-\frac{3}{2}\right)$$



Example: Oblique Linear Asymptote

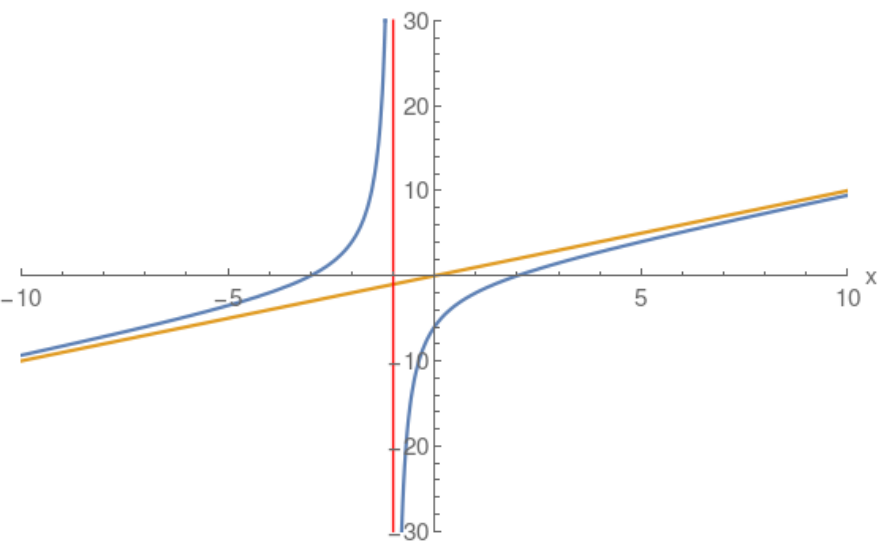
$$\frac{(x-2)\,(x+3)}{x+1}$$

$$+\left(x\right)$$

$$x+1 \quad (1)x^2 \quad +(1)x \quad +(-6)$$

$$\left(x^2\right) \quad +\left(x\right)$$

$$+\left(-6\right)$$



Example: Multiple Vertical Asymptotes

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

$$+\left(0\right)$$

$$\left(x\right) \quad +\left(-2\right)$$