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

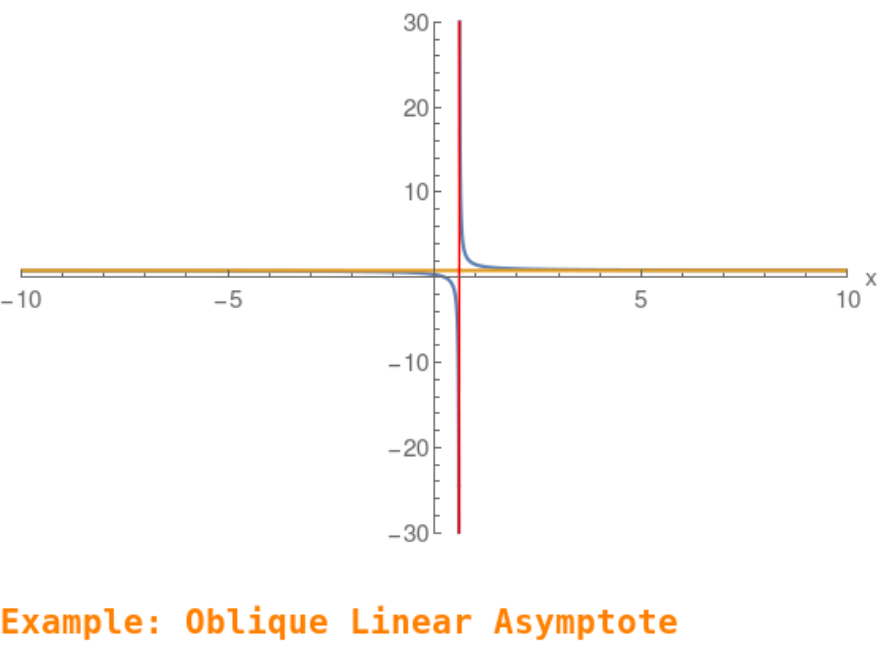
$$\frac{4x-1}{5x-3}$$

$$+\left(\frac{4}{5}\right)$$

$$5x-3 \quad (4)x \quad +(-1)$$

$$\left(4x\right) \quad +\left(-\frac{12}{5}\right)$$

$$+\left(\frac{7}{5}\right)$$



Example: Oblique Linear Asymptote

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

$$+(x) \quad +(1)$$

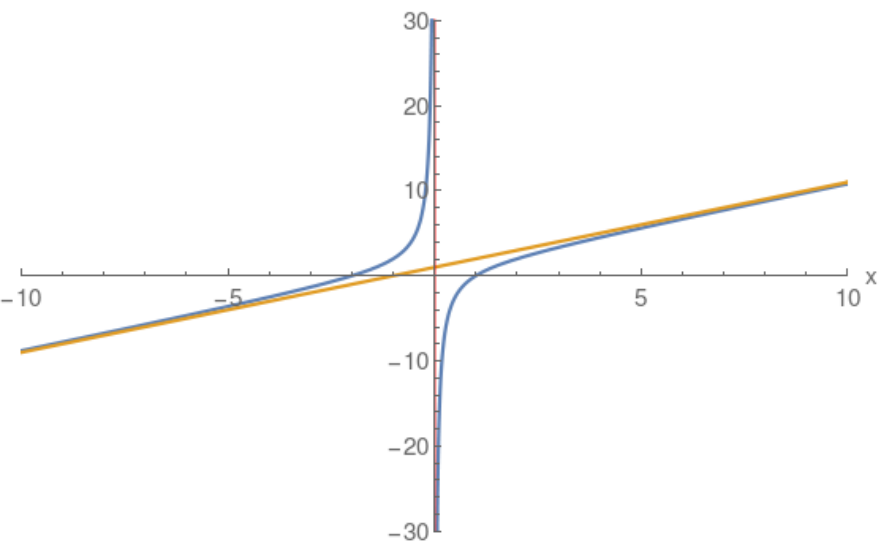
$$x \quad (1)x^2 \quad +(1)x \quad +(-2)$$

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

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

$$+(x)$$

$$+(-2)$$



Example: Multiple Vertical Asymptotes

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

$$+(0)$$

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