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

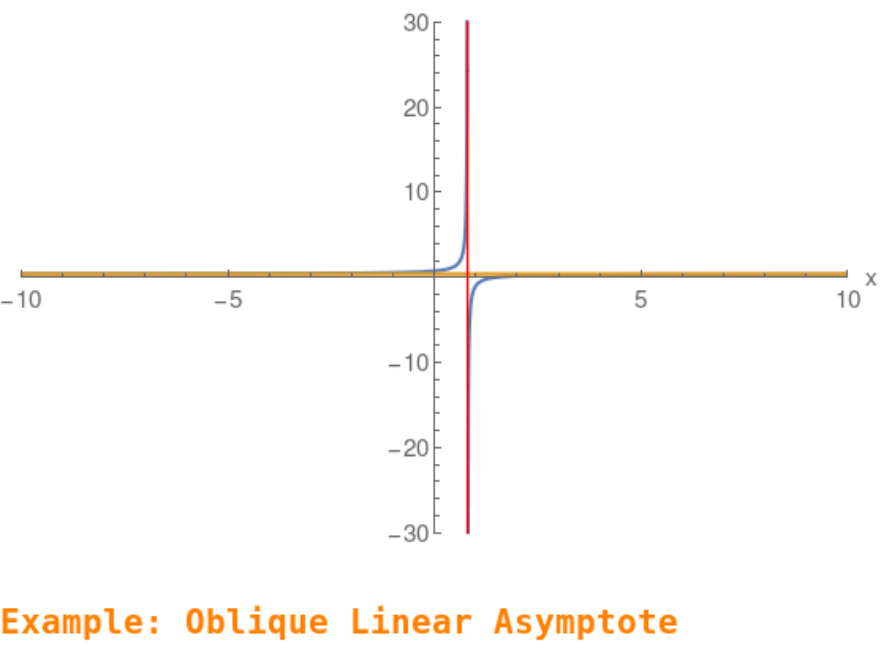
$\frac{2x-3}{5x-4}$

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

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

$\left(2x\right) \quad +\left(-\frac{8}{5}\right)$

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



Example: Oblique Linear Asymptote

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

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

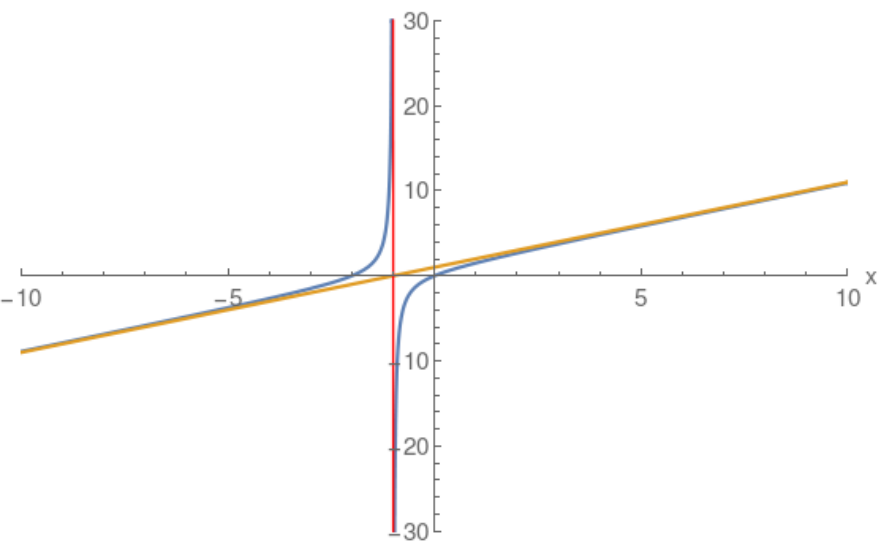
$x+1 \quad (1)x^2 \quad +(2)x$

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

$+(1)x$

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

$+(-1)$



Example: Multiple Vertical Asymptotes

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

$+(0)$

$(x) \quad +(3)$