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.

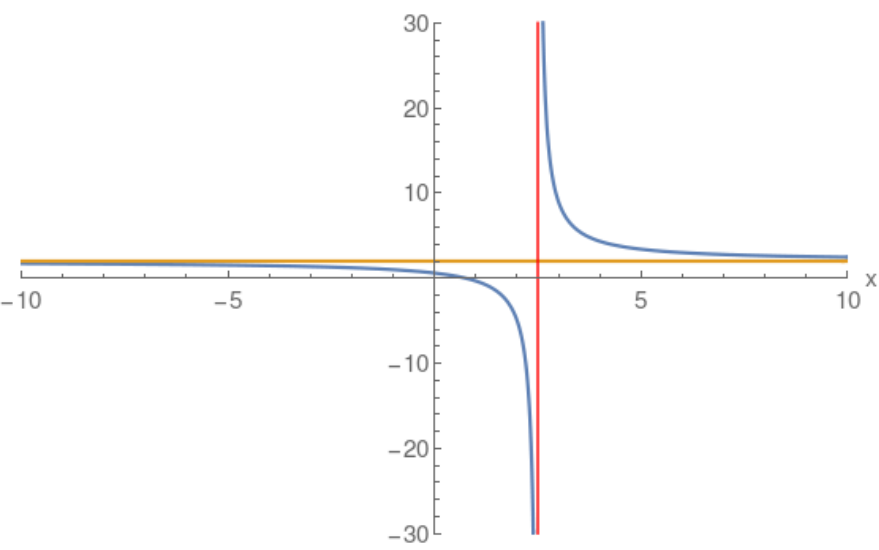
Note: Blue curve the actual Rational function.
Red and Gold asymptotes.

Example: Horizontal Asymptote

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

$$2x-5 \;\big|\; (4)x + (-3) + (2)$$

$$(4x) + (-10) + (7)$$

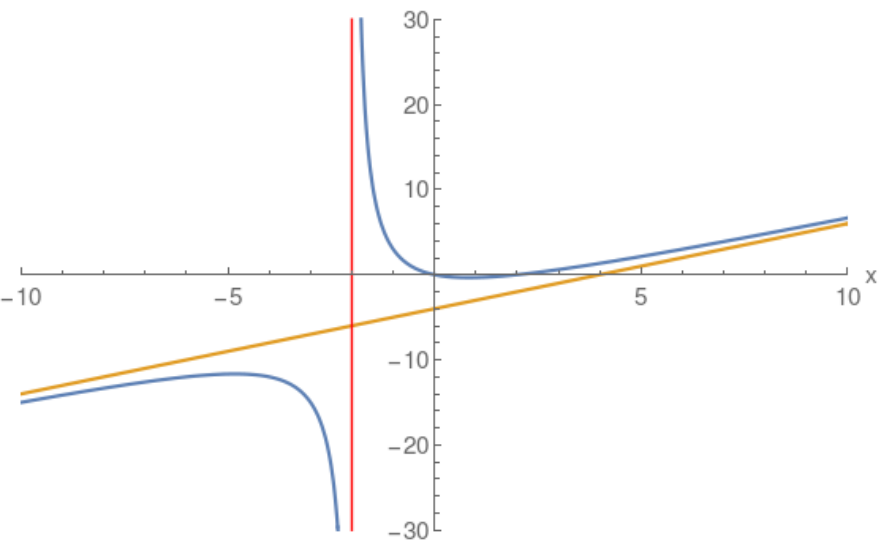


Example: Oblique Linear Asymptote

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

$$x+2 \;\big|\; (1)x^2 + (-2)x + (x) + (-4)$$

$$(x^2) + (2x) + (-4)x + (-4x) + (-8) + (8)$$



Example: Multiple Vertical Asymptotes

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

$$(x) + (3) \;\big|\; + (0)$$