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.
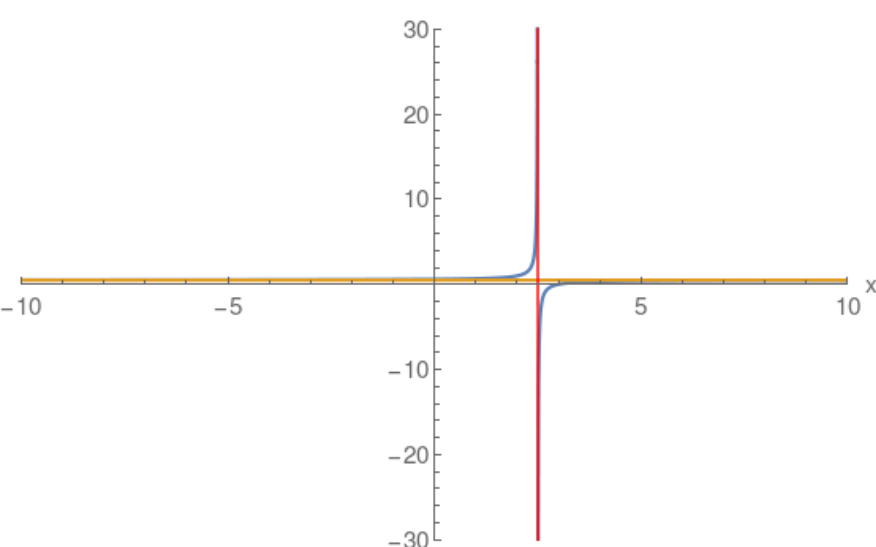**Step 4:** Perform a long division to find the quotient which specifies the oblique asymptote.

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

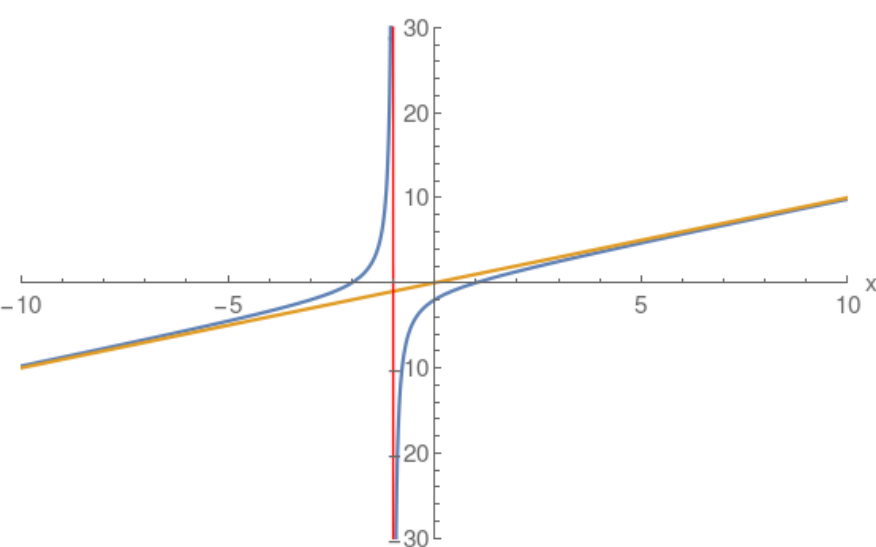## Example: Horizontal Asymptote

$\dfrac{x-3}{2x-5}$

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

$$\boxed{2x-5} \quad (1)x \; +(-3)$$

$$\left(\boxed{x} \right) \; + \left(\boxed{-\tfrac{5}{2}} \right)$$

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

Example: Oblique Linear Asymptote

$\dfrac{(x-1)\;(x+2)}{x+1}$

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

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

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

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

Example: Multiple Vertical Asymptotes

$\dfrac{x-2}{(x+1)\;(x+2)}$

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

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