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.

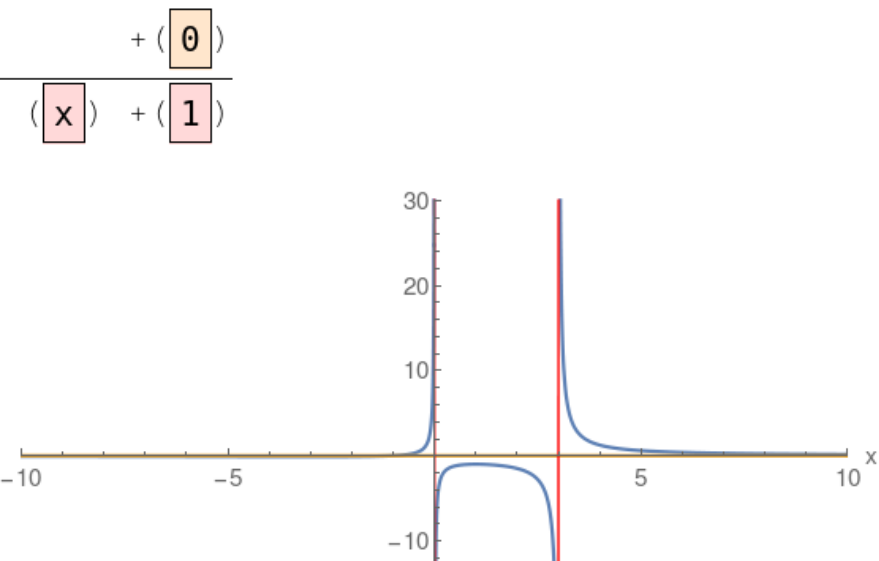
Step 4: Perform a long division to find the quotient which specifies the oblique asymptote.

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

Example: Horizontal Asymptote

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

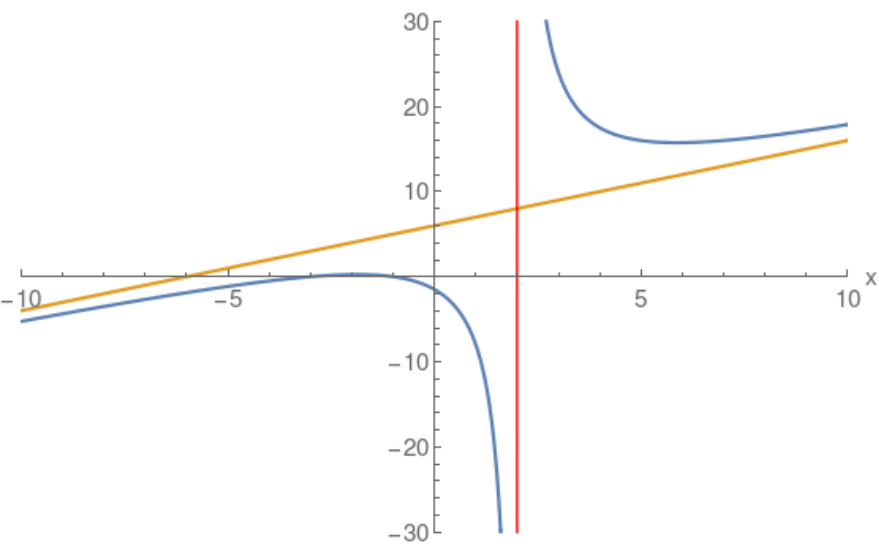
```
                    + ( 4 )
x - 5 | (4) x     + (-2)
      ( 4 x )     + ( -20 )
                  + ( 18 )
```



Example: Oblique Linear Asymptote

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

```
                    + ( x )       + ( 6 )
x - 2 | (1) x^2   + (4) x       + (3)
      ( x^2 )     + ( -2 x )
                  + (6) x       + (3)
                  + ( 6 x )     + ( -12 )
                                + ( 15 )
```



Example: Multiple Vertical Asymptotes

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

```
          + ( 0 )
( x ) + ( 1 )
```