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

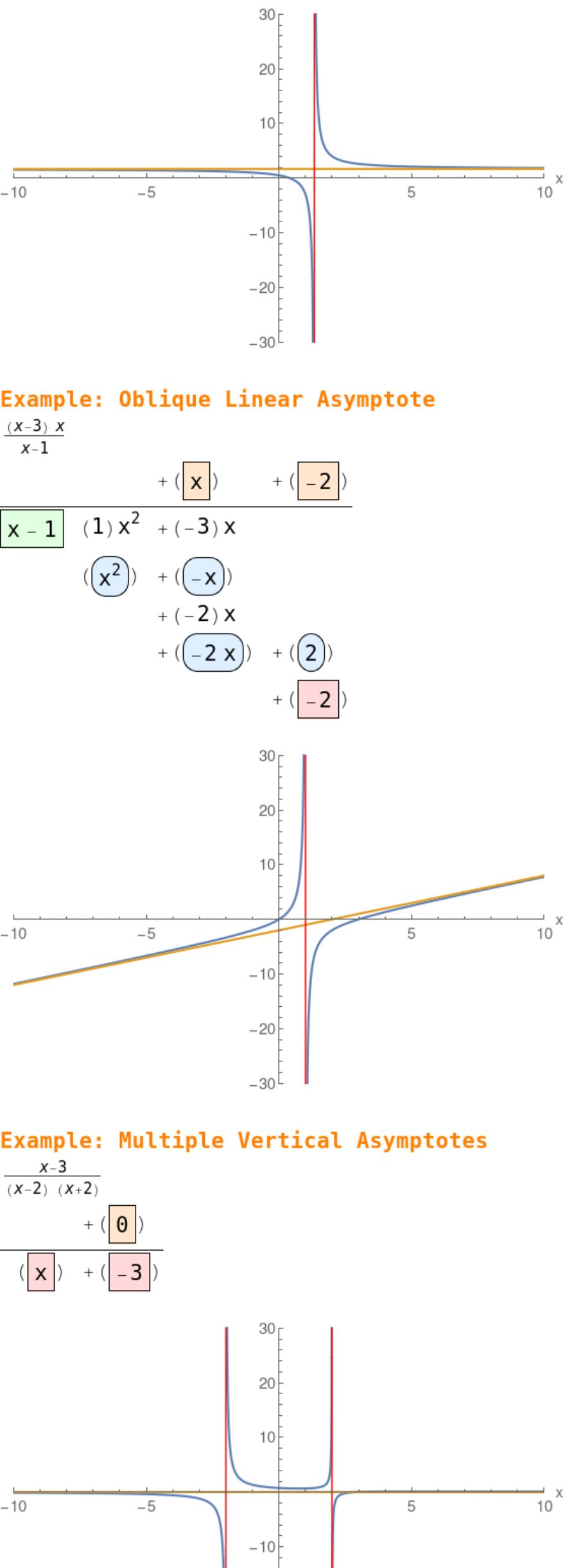
$$\frac{5x-2}{3x-4}$$

$$+\left(\frac{5}{3}\right)$$

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

$$\left(5x\right) + \left(-\frac{20}{3}\right)$$

$$+\left(\frac{14}{3}\right)$$



Example: Oblique Linear Asymptote

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

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

$$x-1 \quad (1)x^2 + (-3)x$$

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

$$+(-2)x$$

$$+\left(-2x\right) + \left(2\right)$$

$$+\left(-2\right)$$

Example: Multiple Vertical Asymptotes

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

$$+\left(0\right)$$

$$\left(x\right) + \left(-3\right)$$