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

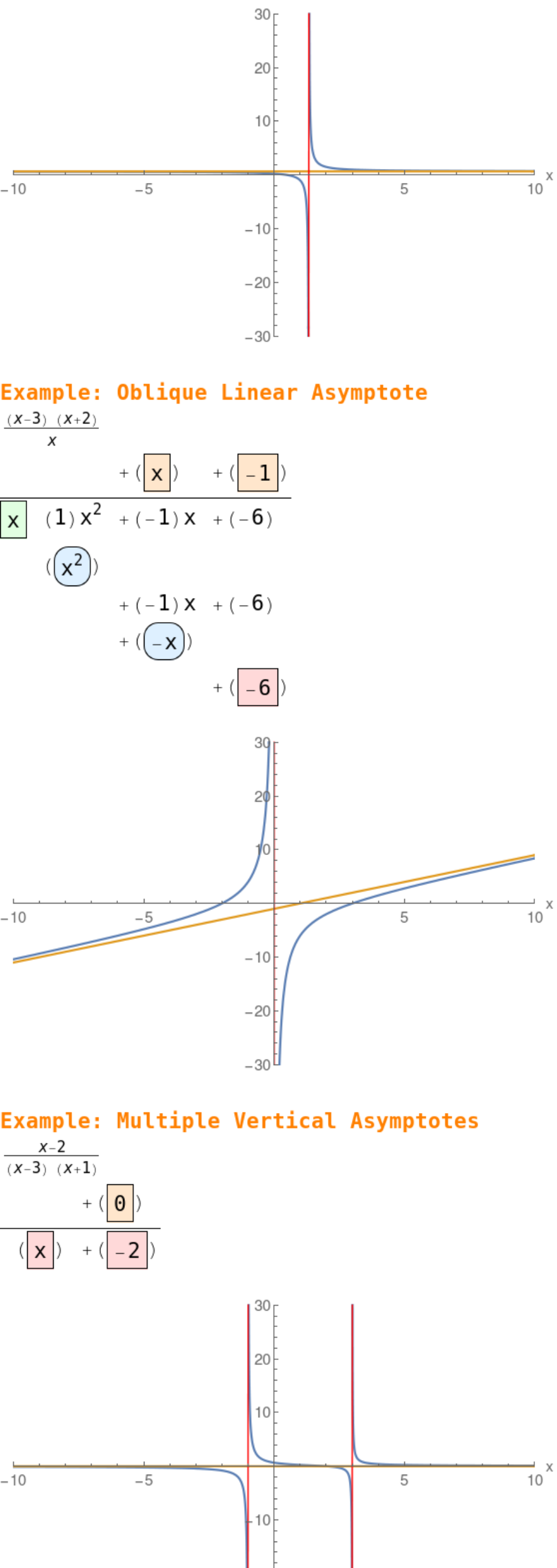
$$\frac{2x-1}{3x-4}$$

$$+\left(\frac{2}{3}\right)$$

$$3x-4 \quad (2)x \quad +(-1)$$

$$\left(2x\right) \quad +\left(-\frac{8}{3}\right)$$

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



Example: Oblique Linear Asymptote

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

$$+\left(x\right) \quad +\left(-1\right)$$

$$x \quad (1)x^2 \quad +(-1)x \quad +(-6)$$

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

$$+(-1)x \quad +(-6)$$

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

$$+\left(-6\right)$$

Example: Multiple Vertical Asymptotes

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

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

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