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

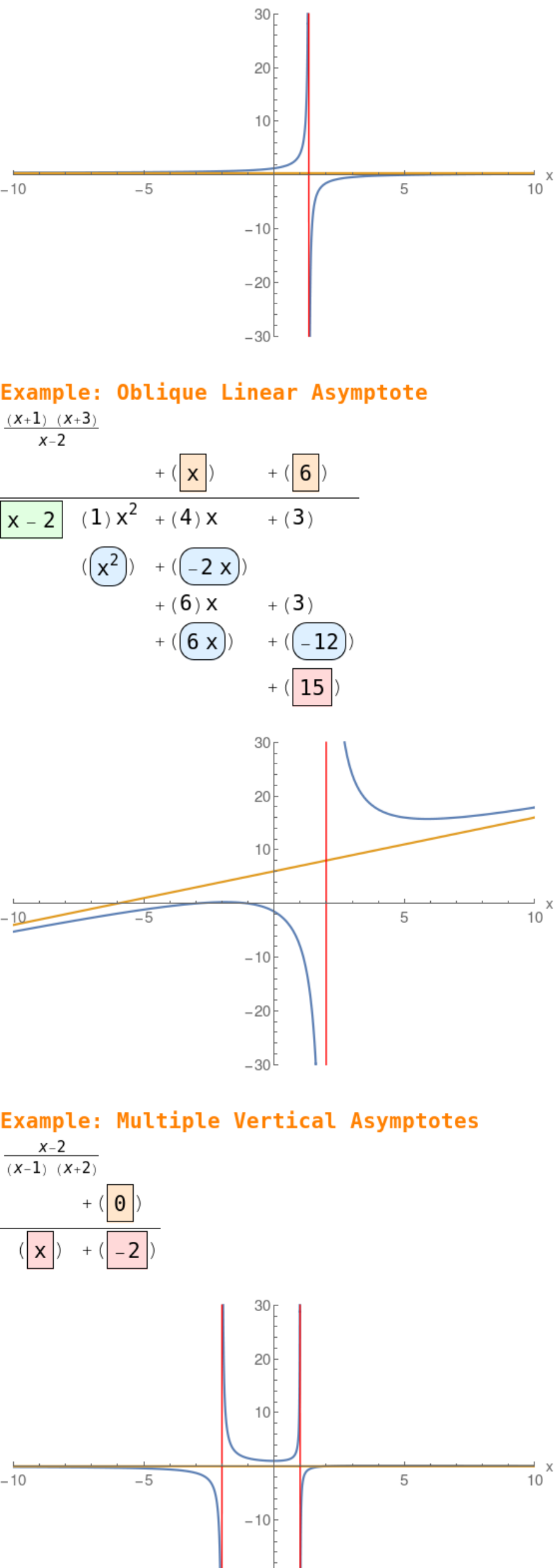
$$\frac{x-5}{3x-4}$$

$$+\left(\frac{1}{3}\right)$$

$$3x-4 \quad (1)x + (-5)$$

$$\left(x\right) + \left(-\frac{4}{3}\right)$$

$$+\left(-\frac{11}{3}\right)$$



Example: Oblique Linear Asymptote

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

$$+\left(x\right) \qquad +\left(6\right)$$

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

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

$$+(6)x + (3)$$

$$+\left(6x\right) + \left(-12\right)$$

$$+\left(15\right)$$

Example: Multiple Vertical Asymptotes

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

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

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