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

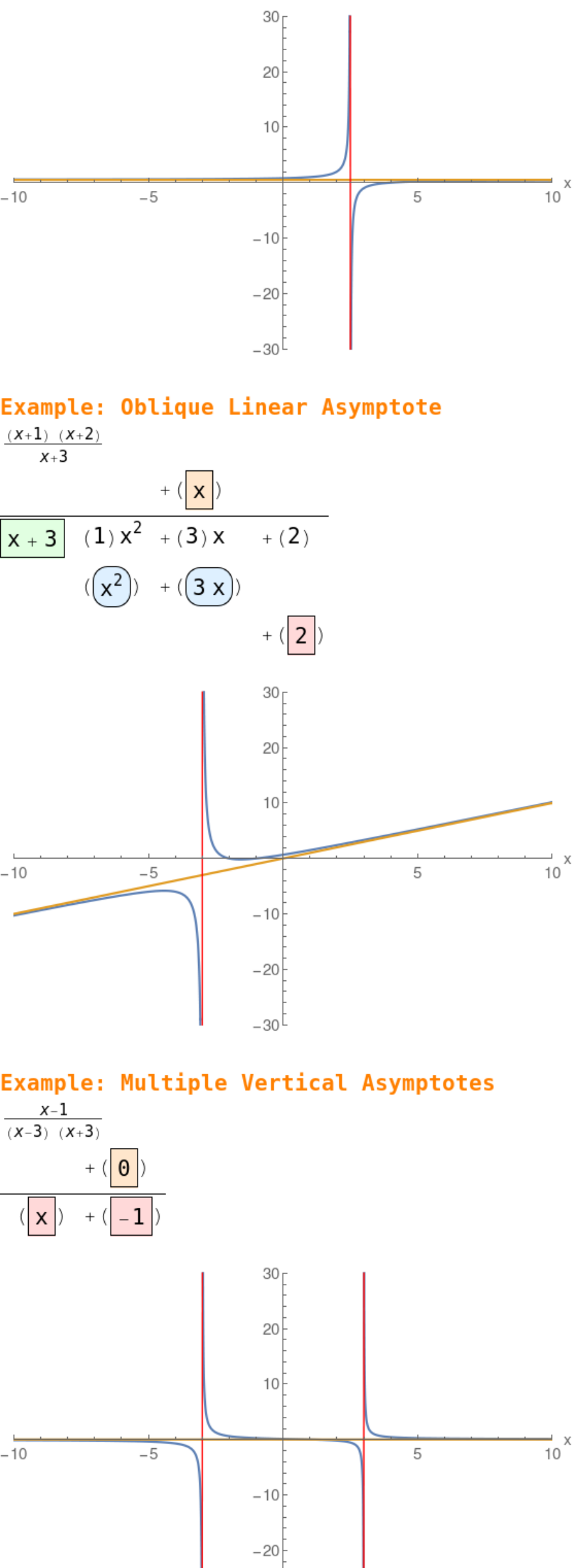
$$\frac{x-4}{2x-5}$$

$$+\left(\frac{1}{2}\right)$$

$$2x-5 \quad (1)x \quad +(-4)$$

$$(x) \quad +\left(-\frac{5}{2}\right)$$

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



Example: Oblique Linear Asymptote

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

$$+(x)$$

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

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

$$+(2)$$

Example: Multiple Vertical Asymptotes

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

$$+(0)$$

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