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

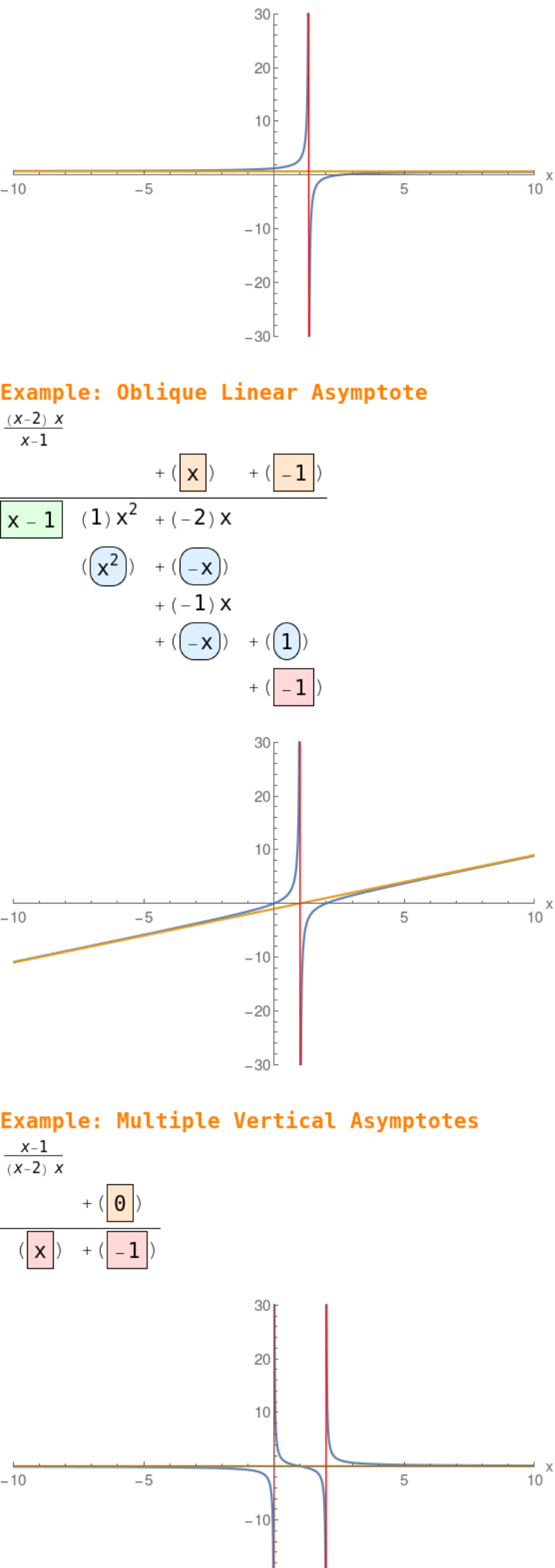
$\frac{2x-5}{3x-4}$

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

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

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

$+\left(-\frac{7}{3}\right)$



Example: Oblique Linear Asymptote

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

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

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

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

$+(-1)x$

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

$+\left(-1\right)$

Example: Multiple Vertical Asymptotes

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

$+\left(0\right)$

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