

Key

Three rational FUNCTIONS

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

Roots: $(-2, 0)$
 $x+2 = 0$
 $\frac{0+2}{0-2}$
 y-intercept: $(0, -1)$
 Vertical asymptotes: $x-2 = 0$
 $x = 2$
 End behavior: $y = \frac{x^2}{x^2} = 1$
 $y = 1$
 Other: hole at $(1, -3)$
 $\frac{1+2}{1-2} = \frac{3}{-1}$

Sign line!

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

Roots: $(-2, 0)$
 y-intercept: $(0, 2)$
 Vertical asymptotes: $x = 1$
 End behavior: $y = \frac{x}{x^2} = \frac{1}{x}$
 $y = 0$
 Other: -

Sign line

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

Roots: $(0, 0), (-1, 0)$
 y-intercept: $(0, 0)$
 Vertical asymptotes: $x = -3$
 End behavior: x^2+2x-3
 $y = x - 2$
 Other: hole at $(1, \frac{1}{2})$
 $\frac{1(1+1)}{1+3} = \frac{2}{4} = \frac{1}{2}$

Sign line

x^2+2x-3
 $\begin{array}{r} x^2+2x-3 \\ -x^2+2x^2-3x \\ \hline -2x^2+2x+0 \\ -2x^2-4x+6 \\ \hline -2x^2-4x+6 \end{array}$

Other: hole at $(1, -3)$
 $\frac{1+2}{1-2} = \frac{3}{-1}$

Sign line

Sign line