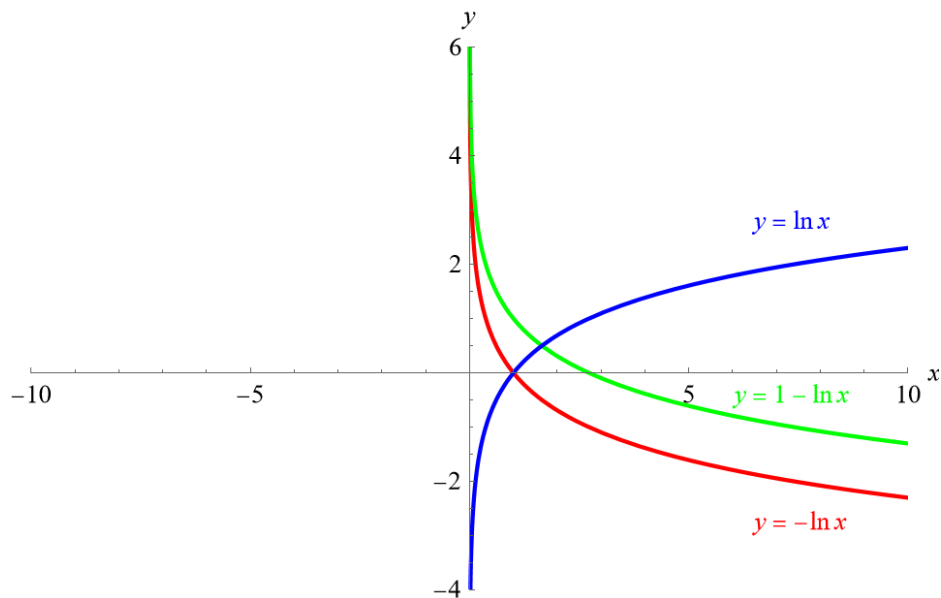## Exercise 267

For the following exercises, sketch the graph of the logarithmic function. Determine the domain, range, and vertical asymptote.

$$f(x) = 1 - \ln x$$

Solution

Placing a minus sign in front of the logarithm reflects the entire graph over the x-axis. Adding 1 then translates the entire graph up by 1 unit.

The argument of a logarithm must be greater than zero.

$$\text{Domain:} \quad \{x \mid x > 0\}$$

$$\text{Range:} \quad \{y \mid -\infty < y < \infty\}$$

$$\text{Vertical Asymptote:} \quad x = 0$$