

Objective: Develop and use properties of the natural logarithmic function.

Use the properties of logarithms to solve for “x” for the function $\ln x + \ln(x - 3) = 0$.

ANSWER:

$$\ln x + \ln(x - 3) = 0$$

$$\ln x(x - 3) = 0$$

$$e^{\ln x(x-3)} = e^0$$

$$x(x - 3) = 1$$

$$x^2 - 3x = 1$$

$$x^2 - 3x - 1 = 0$$

$$x = \frac{3 \pm \sqrt{9 - 4(1)(-1)}}{2(1)}$$

$$x = \frac{3 \pm \sqrt{13}}{2}$$

$$x = \frac{3 + \sqrt{13}}{2} \text{ and } x = \frac{3 - \sqrt{13}}{2}.$$

The solution $x = \frac{3 - \sqrt{13}}{2}$ can be omitted because the value of the solution is less than zero.

Natural logarithms are not defined for negative numbers.