

Math 121 – Quiz 4 Solution

1. Find the exact value of each logarithm without using a calculator.

(a) $\ln \sqrt{e}$

(b) $\log_4 4$

2. Find the **exact** solution(s) to the following equation:

$$\log x + \log(x + 15) = 2$$

Solution:

1. (a) $\ln \sqrt{e} = \ln e^{1/2} = \frac{1}{2} \ln e = \frac{1}{2}$

(b) $\log_4 4 = 1$

2.

$$\log x + \log(x + 15) = 2$$

$$\log[x(x + 15)] = 2$$

$$x(x + 15) = 10^2$$

$$x^2 + 15x - 100 = 0$$

$$(x + 20)(x - 5) = 0$$

$$x = -20, x = 5$$

Since the domain of $\log x$ is all positive reals, the solution is $x = 5$.