

1. [12 points] Solve the following equations for the variable, showing all your work. Write your answers in **exact** form in the blank provided.

a. [4 points] $\ln(11 \cdot e^p) = -14p + 2017$

Solution:

$$\begin{aligned} -14p + 2017 &= \ln(11) + \ln(e^p) \\ &= \ln(11) + p \end{aligned}$$

$$15p = 2017 - \ln(11)$$

$$p = \frac{2017 - \ln(11)}{15}$$

b. [4 points] $\log(10^x + 1) = \pi$.

Solution: Start by taking the base 10 exponential of both sides.

$$10^x + 1 = 10^\pi$$

$$10^x = 10^\pi - 1$$

$$x = \log(10^\pi - 1)$$

$$x = \log(10^\pi - 1)$$

c. [4 points] $e^{t+5} = 10^t$.

Solution:

$$\ln(e^{t+5}) = \ln(10^t)$$

$$t + 5 = t \ln(10)$$

$$t(\ln 10 - 1) = 5$$

$$t = \frac{5}{\ln 10 - 1}$$