

2. [11 points] Solve all the following equations algebraically. Your answers must be written in **exact** form. Show all your work to receive full credit.

a. [3 points] $10^{3\log(x)} = 7$

Solution:

$$10^{3\log(x)} = 7$$

$$10^{\log(x^3)} = 7$$

$$x^3 = 7$$

$$x = 7^{\frac{1}{3}}$$

b. [4 points] $\log(27y) - \log(2y + 1) = 1$

Solution:

$$\log(27y) - \log(2y + 1) = 1$$

$$\log\left(\frac{27y}{2y + 1}\right) = 1$$

$$\frac{27y}{2y + 1} = 10$$

$$27y = 20y + 10$$

$$7y = 10$$

$$y = \frac{10}{7}$$

c. [4 points] $z \ln(7z + 17) = 0$

Solution:

$$z = 0$$

$$\ln(7z + 17) = 0$$

$$e^{\ln(7z+17)} = e^0$$

$$7z + 17 = 1$$

$$7z = -16$$

$$z = -\frac{16}{7}$$