

# Math 121 HW #4

2.5 #14, 30, 46, 57, 68b

2.5 #14

$$\log_9 81 = 2, \quad \text{since } 9^2 = 81.$$

2.5 #30

$$\begin{aligned} \log_7 \frac{15p}{7y} &= \log_7(15p) - \log_7(7y) \\ &= \log_7 15 + \log_7 p - (\log_7 7 + \log_7 y) \\ &= \log_7 15 + \log_7 p - (1 + \log_7 y) \\ &= \log_7 15 + \log_7 p - 1 - \log_7 y \end{aligned}$$

2.5 #46

$$\begin{aligned} \log_4(5x+1) &= 2 \\ 4^{\log_4(5x+1)} &= 4^2 \end{aligned}$$

$$5x+1 = 16$$

$$5x = 15$$

$$\underline{x = 3}$$

2.5 #57

$$\begin{aligned} e^{2y} &= 15 \\ \ln e^{2y} &= \ln 15 \\ 2y &= \ln 15 \\ y &= \frac{\ln 15}{2} \\ y &= 1.35 \end{aligned}$$

2.5 #68b

$$45000 = 15000 \left(1 + \frac{.07}{1}\right)^{1 \cdot t}$$

$$3 = 1.07^t$$

$$\ln 3 = \ln 1.07^t$$

$$\ln 3 = t \ln 1.07$$

$$t = \frac{\ln 3}{\ln 1.07} = 16.23 \text{ yrs}$$