

Math 121 – Quiz 4 Solution

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

(a) $\log_2 8$

(b) $\log 1000$

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

$$2^{x+1} = 5^x$$

Solution:

1. (a) $\log_2 8 = \log_2 2^3 = 3 \log_2 2 = 3$

(b) $\log 1000 = \log 10^3 = 3 \log 10 = 3$

2.

$$2^{x+1} = 5^x$$

$$(x + 1) \ln 2 = x \ln 5$$

$$(\ln 2)x + \ln 2 = (\ln 5)x$$

$$(\ln 2)x - (\ln 5)x = -\ln 2$$

$$x(\ln 2 - \ln 5) = -\ln 2$$

$$x = \frac{\ln 2}{\ln 5 - \ln 2}$$