Assignment # 2

HW # 2 5.2 p 402 # 6, 8, 26, 28, 30, 42, 52, 53, 55, 56

6. $\log_4 x = -2$

$$x = 4^{-2} = \frac{1}{16}$$

8. $\log_{25} x = \frac{1}{2}$

$$x = 25^{1/2}$$

$$x = 5$$

26. $\log_a x = 3.1 \quad \log_a y = 1.8 \quad \log_a z = 2.7$

a. $\log_a (yz) = \log_a y + \log_a z = 1.8 + 2.7 = 4.5$

b. $\log_a \left(\frac{z}{y}\right) = \log_a z - \log_a y = 2.7 - 1.8 = 0.9$

c. $\log_a (y^6) = 6 \log_a y = 6(1.8) = 10.8$

d. $\log_a \sqrt[3]{z} = \frac{1}{3}\log_a z = \frac{1}{3}(2.7) = 0.9$

28. $\ln\left[(x+1)(4x+5)\right] = \ln(x+1) + \ln(4x+5)$

30. $\log_5 \left|\frac{x^2}{\sqrt{x+4}}\right| = \log_5 x^2 - \log_5 (x+4)^{1/2}$

$$= 2\log_5 x - \frac{1}{2}\log_5 (x+4)$$

42. a. $\log_3 12 = \frac{\log 12}{\log 3} = 2.2619$

b. $\log_8 (0.15) = \frac{\log 0.15}{\log 8} = -0.9123$

52. Measurement is $8.9 - 7.7 = 1.2$ units larger. Intensity is $10^{1.2} = 15.8$ times greater.

53. Intensity of the 1906 San Francisco quake: $10^{8.25} I_0$

Intensity of the 1989 San Francisco quake: $10^{7.1} I_0$

The 1906 quake was

$$\frac{10^{8.25} I_0}{10^{7.1} I_0} = 10^{8.25-7.1} = 10^{1.15} \approx 14$$

times as severe.

55. $L = 10\log(10,000) = 10 \cdot 4 = 40$

56. $L = 10\log(10^{14}) = 10(14\log 10) = 140 \cdot 1$

$= 140$ decibels.