

8.R Review

Last day's Work: pp. 499–501 #1 to ³4, 5ab, 6ab, 7, 10, 13, 14*, 15
*#14) 7.5 years _b

Previously Assigned Review Work:

Begin Review p. 510

#1c, 2d, 3d*graph too, 4, 5b, 6b, 8*, 9, 10abc, 11c, 12, 13

**the answer for 8d is 3.*

**the answer for 11c is 2.552*

Today's Entertainment: p.511 #14bc, 15cd, 17, 18, 19*, 20, 22
**the answer for 19 is 4 times or 3.98*

+ p.512 Chapter Self-Test

(#5 has a typo: it should be $y^{1/3}$.

The final answer for #3b should be 2.

*Finally, in #6 they rounded too early in their solution
– the final answer should be 7.827)*

- p. 499 3. A particular sound is 1 000 000 times more intense than a sound you can just barely hear. What is the loudness of the sound in decibels?

$$\begin{aligned}
 3) \quad L &= 10 \log\left(\frac{I}{I_0}\right) & \therefore L &= 10 \log\left(\frac{10^{-6}}{10^{-12}}\right) \\
 I &= 1\,000\,000 \times \text{barely hear} & &= 10 \log(10^{-6-(-12)}) \\
 &= 1\,000\,000 \times 10^{-12} & &= 10 \log 10^6 \\
 &= 10^6 \times 10^{-12} & &= 10(6) \\
 &= 10^{-6} & &= 60 \text{ dB}
 \end{aligned}$$

$\log 10 = 1$ $\log 100 = 2$

- p. 499 4. The loudness of a heavy snore is 69 dB. How many times as loud as a normal conversation of 60 dB is a heavy snore?

$$\begin{aligned}
 4. \quad & 69 \text{ dB vs } 60 \text{ dB} \\
 & 69 = 10 \log\left(\frac{I_S}{I_0}\right) ; 60 = 10 \log\left(\frac{I_N}{I_0}\right) \\
 & 6.9 = \log\left(\frac{I_S}{I_0}\right) \quad 6 = \log\left(\frac{I_N}{I_0}\right) \\
 & 10^{6.9} = \frac{I_S}{I_0} \quad 10^6 = \frac{I_N}{I_0} \\
 & I_S = 10^{6.9} I_0 \quad I_N = 10^6 I_0 \\
 \therefore \frac{I_S}{I_N} &= \frac{10^{6.9} \cancel{I_0}}{10^6 \cancel{I_0}} \\
 &= 10^{6.9-6} \\
 &= 10^{0.9} \\
 &= 7.94 \text{ times as loud}
 \end{aligned}$$

- p. 499 5. Calculate the hydrogen ion concentration of each substance.
- a) baking soda, with a pH of 9
 - b) milk, with a pH of 6.6
 - c) an egg, with a pH of 7.8
 - d) oven cleaner, with a pH of 13

$$\begin{aligned} 5. \quad pH &= -\log [H^+] \\ a) \quad pH &= 9 \quad \text{baking soda} \\ \therefore 9 &= -\log [H^+] \\ -9 &= \log [H^+] \\ [H^+] &= 10^{-9} \\ &= 0.000\,000\,001 \end{aligned}$$

- p. 500 7. a) Distilled water has an H^+ concentration of 10^{-7} mol/L. Calculate the pH of distilled water.
- b) Drinking water from a particular tap has a pH between 6.3 and 6.6. Is this tap water more or less acidic than distilled water? Explain your answer.

$$7a) [H^+] = 10^{-7}$$

$$pH = -\log(10^{-7})$$

$$= 7$$

b) tap water is more acidic, b/c the lower the pH the higher the acidity.

- p. 501 14. How long will it take for \$2500 to accumulate to \$4000 if it is invested at an interest rate of 6.5%/a, compounded annually?

$$14) A = P(1+i)^n$$

$$4000 = 2500(1.065)^n$$

$$\frac{4000}{2500} = 1.065^n$$

$$\log 1.6 = n \log 1.065$$

$$n = \frac{\log 1.6}{\log 1.065}$$

$$\approx 7.46$$

$$\approx 7.5 \text{ years}$$

*BW

- p. 501 15. A wound, initially with an area of 80 cm^2 , heals according to the formula $A(t) = 80(10^{-0.023t})$, where $A(t)$ is the area of the wound in square centimetres after t days of healing. In how many days will 75% of the wound be healed?

$$15) A(t) = 80(10^{-0.023t})$$

$$75\% \text{ of } 80 \text{ cm}^2$$

$$= 60 \text{ cm}^2$$

$$\therefore \text{Area of Wound} = 80 \text{ cm}^2 - 60 \text{ cm}^2 \\ = 20 \text{ cm}^2$$

$$\therefore 20 = 80(10^{-0.023t})$$

$$\frac{1}{4} = 10^{-0.023t}$$

$$\log \frac{1}{4} = -0.023t \log 10$$

$$\log \frac{1}{4} = t$$

$$\frac{-0.023}{-0.023} \therefore t = 26.17 \therefore 26.2 \text{ days}$$