

Chapter 13 — Problem Set 1

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1.

$$\frac{(.0014)^2}{.1} = 1.96 \cdot 10^{-5} \quad (1)$$

2.

$$\begin{aligned} x^2 &= 1.5 \cdot .00014 \\ x &= \sqrt{1.5(.00014)} \\ -\log_{10}(x) &= 1.84 \end{aligned} \quad (2)$$

3.

$$\begin{aligned} \frac{75}{46} &= 1.63[\text{M}] \\ x &= \sqrt{1.63(.00018)} \\ -\log_{10}(x) &= 1.77 \end{aligned} \quad (3)$$

4.

$$\begin{aligned} 10^{-14+9.8} &= 6.31 \cdot 10^{-5}[\text{M}] \\ \frac{1}{299} &= 3.34 \cdot 10^{-3}[\text{mol}] \\ \frac{3.34 \cdot 10^{-3}}{.12} &= .0279[\text{M}] \\ \frac{(6.31 \cdot 10^{-5})^2}{.0279} &= 1.43 \cdot 10^{-7} \end{aligned} \quad (4)$$

5.

$$\begin{aligned} 14 - 11.65 &= 2.35 \\ 10^{-2.35} &= 4.47 \cdot 10^{-3}[\text{M}] \\ .25 \cdot 4.47 \cdot 10^{-3} &= 1.12 \cdot 10^{-3}[\text{mol}] \\ .075 \cdot .366 &= .02745 \\ -\log_{10} \left(\frac{1.12 \cdot 10^{-3} + .02745}{.325} \right) &= 1.056 \\ 14 - 1.056 &= 12.94 \end{aligned} \quad (5)$$

6.

$$\begin{aligned}
 \frac{2}{74} &= .027[\text{M}] \\
 \frac{14.6}{40} &= .365[\text{M}] \\
 -\log_{10}\left(\frac{.365 + .027}{1.2}\right) &= .486 \\
 14 - .486 &= 13.514
 \end{aligned}
 \tag{6}$$