38. Our approach (based on Eq. 23-29) consists of several steps. The first is to find an *approximate* value of $e$ by taking differences between all the given data. The smallest difference is between the fifth and sixth values: $18.08 \times 10^{-19}\,\mathrm{C} - 16.48 \times 10^{-19}\,\mathrm{C} = 1.60 \times 10^{-19}\,\mathrm{C}$ which we denote $e_{\text{approx}}$. The goal at this point is to assign integers $n$ using this approximate value of $e$:

$$
\begin{array}{llll}
\text{datum 1} & \dfrac{6.563 \times 10^{-19}\,\mathrm{C}}{e_{\text{approx}}} = 4.10 & \Longrightarrow & n_1 = 4 \\
\text{datum 2} & \dfrac{8.204 \times 10^{-19}\,\mathrm{C}}{e_{\text{approx}}} = 5.13 & \Longrightarrow & n_2 = 5 \\
\text{datum 3} & \dfrac{11.50 \times 10^{-19}\,\mathrm{C}}{e_{\text{approx}}} = 7.19 & \Longrightarrow & n_3 = 7 \\
\text{datum 4} & \dfrac{13.13 \times 10^{-19}\,\mathrm{C}}{e_{\text{approx}}} = 8.21 & \Longrightarrow & n_4 = 8 \\
\text{datum 5} & \dfrac{16.48 \times 10^{-19}\,\mathrm{C}}{e_{\text{approx}}} = 10.30 & \Longrightarrow & n_5 = 10 \\
\text{datum 6} & \dfrac{18.08 \times 10^{-19}\,\mathrm{C}}{e_{\text{approx}}} = 11.30 & \Longrightarrow & n_6 = 11 \\
\text{datum 7} & \dfrac{19.71 \times 10^{-19}\,\mathrm{C}}{e_{\text{approx}}} = 12.32 & \Longrightarrow & n_7 = 12 \\
\text{datum 8} & \dfrac{22.89 \times 10^{-19}\,\mathrm{C}}{e_{\text{approx}}} = 14.31 & \Longrightarrow & n_8 = 14 \\
\text{datum 9} & \dfrac{26.13 \times 10^{-19}\,\mathrm{C}}{e_{\text{approx}}} = 16.33 & \Longrightarrow & n_9 = 16
\end{array}
$$

Next, we construct a new data set $(e_1, e_2, e_3 \ldots)$ by dividing the given data by the respective exact integers $n_i$ (for $i = 1, 2, 3 \ldots$):

$$(e_1, e_2, e_3 \ldots) = \left( \frac{6.563 \times 10^{-19}\,\mathrm{C}}{n_1}, \frac{8.204 \times 10^{-19}\,\mathrm{C}}{n_2}, \frac{11.50 \times 10^{-19}\,\mathrm{C}}{n_3} \ldots \right)$$

which gives (carrying a few more figures than are significant)

$$\left(1.64075 \times 10^{-19}\,\mathrm{C},\ 1.6408 \times 10^{-19}\,\mathrm{C},\ 1.64286 \times 10^{-19}\,\mathrm{C} \ldots\right)$$

as the new data set (our experimental values for $e$). We compute the average and standard deviation of this set, obtaining

$$e_{\text{exptal}} = e_{\text{avg}} \pm \Delta e = (1.641 \pm 0.004) \times 10^{-19}\ \mathrm{C}$$

which does not agree (to within one standard deviation) with the modern accepted value for $e$. The lower bound on this spread is $e_{\text{avg}} - \Delta e = 1.637 \times 10^{-19}\,\mathrm{C}$ which is still about 2% too high.