

6.5: Exercises

1. Berglund and Wichardt investigated the quantitative determination of Cr in high-alloy steels using a potentiometric titration of Cr(VI). Before the titration, samples of the steel were dissolved in acid and the chromium oxidized to Cr(VI) using peroxydisulfate. Shown here are the results (as %w/w Cr) for the analysis of a reference steel as reported in Berglund, B.; Wichardt, C. *Anal. Chim. Acta* **1990**, 236, 399–410.

16.968	16.922	16.840	16.883
16.887	16.977	16.857	16.728

Calculate the mean, the standard deviation, and the 95% confidence interval about the mean. What does this confidence interval mean?

2. In Exercise 4.3.2 you determined the mean and the variance for 10 separate tablets of Excedrin Extra Strength Pain Reliever gives the following results (in mg). The data in this problem are from Simonian, M. H.; Dinh, S.; Fray, L. A. *Spectroscopy* **1993**, 8(6), 37–47.

224.3	240.4	246.3	239.4	253.1
261.7	229.4	255.5	235.5	249.7

Assuming that \bar{X} and s^2 are good approximations for μ and for σ^2 , and that the population is normally distributed, what percentage of the tablets are expected to contain more than the standard amount of 250 mg acetaminophen per tablet?

3. In Exercise 4.3.3 you determined the mean and the standard deviation for the amount of morphine hydrochloride in each of four different nominal dosages levels using data from Salem, I. I.; Galan, A. C. *Anal. Chim. Acta* **1993**, 283, 334–337. All results are in mg/tablet.

100-mg tablets	60-mg tablets	30-mg tablets	10-mg tablets
99.17	54.21	28.51	9.06
94.31	55.62	26.25	8.83
95.92	57.40	25.92	9.08
94.55	57.51	28.62	
93.83	52.59	24.93	

For each dosage level, and assuming that \bar{X} and s^2 are good approximations for μ and for σ^2 , and that the population is normally, what percentage of tablets contain more than the nominal amount of morphine hydrochloride per tablet?

4. Use this [link](#) to access a case study on data analysis and complete the last three investigations included in Part IV: Ways to Model Data and the first three investigations included in Part V: Ways to Draw Conclusions from Data.

This page titled 6.5: Exercises is shared under a [CC BY-NC-SA 4.0](#) license and was authored, remixed, and/or curated by [David Harvey](#).