Show **all** of your work on this assignment and answer each question fully in the given context.

Please write as legible as possible because if the TA cannot read your handwriting, it may cause confusion and ends up in deduction.

If you are going to type your answers, submit a pdf.
If you take a photo/scan your handwritten answers, submit them in a single file.
You can download scanning apps for iOS or via Microsoft Office Lens|PDF Scan App or for

1. **[Ch. 6.1, Exercise 2, pg. 344]** We have a data set consisting of the aluminum contents of 26 bihourly samples of recycled PET plastic from a recycling facility. Those 26 measurements have $\overline{y} = 142.77$ ppm and $s \approx 98.2$ ppm. Use these facts to respond to the following.

   (a) Make a 90% two-sided confidence interval for the mean aluminum content of such specimens over the whole study period.[5 pts]

   (b) Make a 95% two-sided confidence interval for the mean aluminum content of such specimens over the whole study period. How does this compare to your answer in part a)? [5 pts]

   (c) Make a 90% upper confidence bound for the mean aluminum content of such speciments over the whole study period. (Find a such that $(\infty, \#)$ is a 90% confidence interval.) How does this value compare to the upper endpoint of your interval from part a)? [5 pts]

   (d) Make a 95% upper confidence bound for the mean aluminum content of such speciments over the whole study period. (Find a such that $(\infty, \#)$ is a 95% confidence interval.) How does this value compare to the upper endpoint of your interval from part c)? [5 pts]

   (e) Interpret your interval from a) for someone with little statistical background. [5 pts]

2. **[Ch 6.1, Exercise 4, pg. 344]** DuToit, Hansen, and Osborne measured the diameters of some no. 10 machine screws with two different calipers (digital and vernier scale). Part of their data are recorded here. Given in the small frequency table are the measurements obtained on 50 screws by one of the students using the digital calipers.

Diameter	Frequency
4.52	1
4.66	4
4.67	7
4.68	7
4.69	14
4.70	9
4.71	4
4.72	4

   (a) Compute the sample mean and standard deviation for these data. [5 pts]

   (b) Use your sample values from a) and make a 98% two-sided confidence interval for the mean diameter of such screws as measured by this students with these calipers. [5 pts]

(c) Repeat part b) using 99% confidence. How does this interval compare with the one from b)? [5 pts]

(d) Use your values from a) and find a 98% lower confidence bound for the mean diameter. (Find a such that $(\#, \infty)$ is a 98% confidence interval.) How does this value compare to the lower endpoint of your interval from b)? [5 pts]

(e) Repeat part d) using 99% confidence. How does the value computed here compare with your answer for d)? [5 pts]

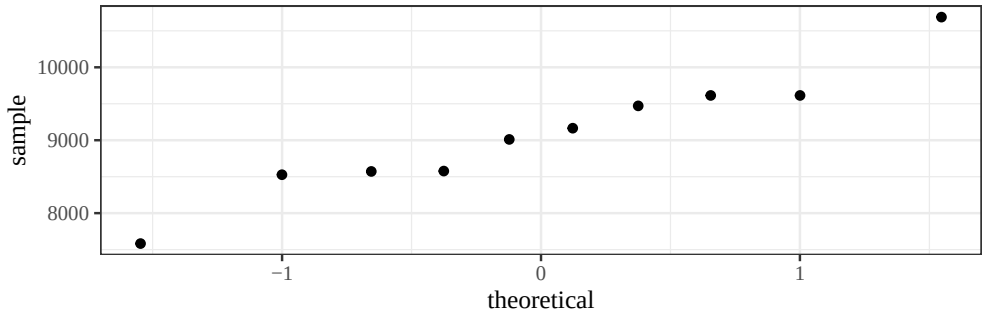
(f) Interpret your interval from b) for someone with little statistical background.[5 pts]

3. **[Ch. 6.2, Exercise 1, pg. 361]** In the aluminum containment study from Homework 10 Exercise 1, it was desirable to have mean aluminum content for samples of rexycled plastic below 200 ppm. Use the six-step significance testing format and determine the strengths of the evidence in the data that in fact this contamination goal has been violated. (You will want to begin with $H_0 : \mu = 200$ ppm and use $H_A : \mu > 200$ ppm.) [10 pts]

4. **[Ch. 6.2, Exercise 4, pg. 361]** In the context of the machine screw diameter study of Exercise 2 from Homework 10, suppose that the nominal diameter of such screws is 4.70 mm. Use the six-step significance-testing format and assess the strength of the evidence provided by the data that the long-run mean measured diameter differs from nominal. (You will want to begin with $H_0 : \mu = 4.70$ mm and use $H_A : \mu \neq 4.70$ mm.) [10 pts]

5. **[Ch 6, Exercise 1, pg. 427]** Consider the breaking strengths of paper towels.

Test	1	2	3	4	5	6	7	8	9	10
Breaking_Strength	8577	9471	9011	7583	8572	10688	9614	9614	8527	9165



Notice that the normal plot of these data given above is reasonably linear. It may thus be sensible to suppose that breaking strengths for generic towels of this type (as measured by the students) are adequately modeled as normal. Under this assumption,

(a) Make and interpret 95% two-sided and one-sided confidence intervals (one-sided of the form $(\#, \infty)$) for the mean breaking strength of generic towels.[5 pts]

Total: 85 pts