Examples from Module 8 review (notes on website from review, review video available in BbLearn)

Helium porosity:

Assumptions:

1. Independence (covered if randomization is met): since it is a random sample, this is met
2. Randomization: yes random sample
3. Normality ($n \geq 30$ or normal distribution): normal distribution

Checklist:

1. $df = n - 1 = 16 - 1 = 15$
2. Estimate of mean: 4.689912$\approx 4.69$
3. CI: 4.259962 5.119862$= 4.26, 5.12$
4. Interpretation: With 95% confidence, the true mean helium porosity in coal seams is between 4.26 and 5.12%

Helmets:

One Sample t-test
data: helmets
t = 11.47, df = 74, p-value < 2.2e-16
alternative hypothesis: true mean is not equal to 0
99 percent confidence interval:
0.4924727 0.7875273
sample estimates:
mean of x
0.64

Assumptions:

1. Independence is met because random
2. Random – yes
3. Normality: $n \geq 60 ==> n = 75$ so yes

Checklist:

1. $df = n - 1 = 75 - 1 = 74$
2. Mean (proportion): $\hat{\pi} = 0.64$
3. CI: 0.4924727 0.7875273
4. Interpretation: We are 99% confident the true proportion of helmets with damage is between 49.25 and 78.75%

Circuit boards:

data: boards
t = 43.482, df = 24, p-value < 2.2e-16
alternative hypothesis: true mean is not equal to 0
90 percent confidence interval:
0.06288548 0.06803687
sample estimates:
mean of x
0.06546117

Assumptions:

1. Independence (is random so met)
2. Random: yes
3. Normality: distribution is normal so is met

Checklist:

1. $df = n - 1 = 25 - 1 = 24$
2. Mean: 0.0655
3. CI: 0.0629, 0.0680
4. With 90% confidence, the true mean warpage of circuit boards is between 0.0629 and 0.068 (do not know what units of measurement are here…)