

8B When N is larger than 40

Contents

8ASubsections

A.1 One-sample Z-test for μ

A.2 z-test vs t-test

A.3 Meaning of p-value

8B Subsections

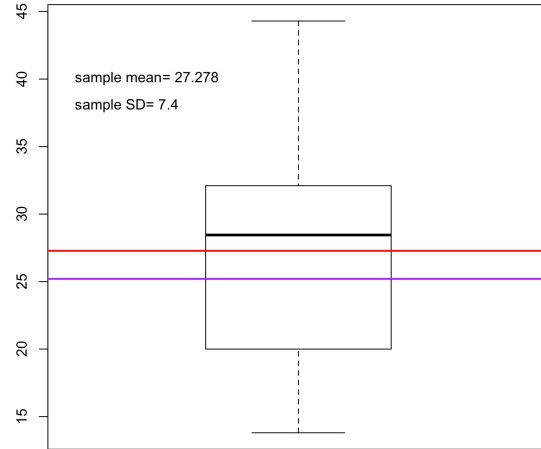
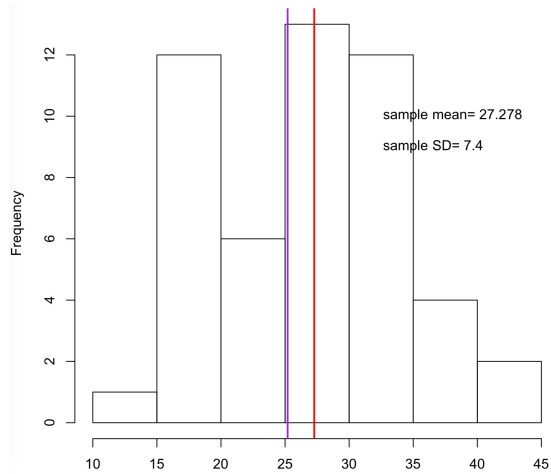
[\[ToC\]](#)

B.1 Ex: Hydro Turbines

- Hydroelectric miniturbines that generate low-cost clean electric power from small rivers and streams.
- Old model average 25.2 Kw under the lab condition.
- Recently the model design was changed, and that supposed to improve the average output.
- $n=50$, sample mean 27.278, sigma is known to be 3.2.

18.5, 28.5, 19.6, 32.1, 27.0, 28.4, 30.4, 15.8, 32.5, 32.9, 28.7,
39.8, 22.6, 22.0, 18.0, 38.4, 28.7, 22.2, 32.9, 30.4, 17.8, 44.3,
32.3, 29.9, 15.6, 19.6, 25.9, 23.9, 27.8, 35.0, 29.8, 22.4, 16.0,
39.4, 38.3, 32.0, 30.7, 28.7, 31.5, 26.9, 24.3, 29.1, 13.8, 34.9,
20.0, 19.6, 19.1, 40.2, 18.2, 27.5

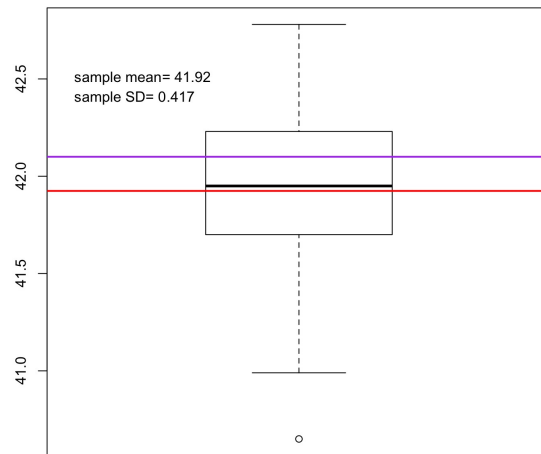
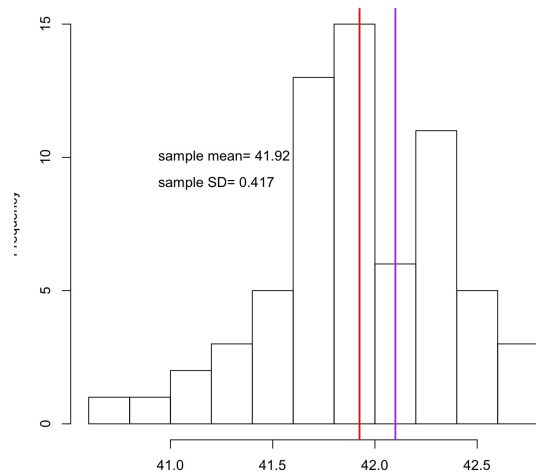
B.2 figg



B.3 Ex: Heat Transfer

- An article in the Journal of Heat Transfer described measuring the thermal conductivity of newly constructed iron alloy.
- Using a temperature of 100F and a power input of 550 wtts, the following 65 measurements of thermal conductivity (in Btu/hr-ft-F) were obtained:
- Is this an evidence that the true thermal conductivity of Armco iron is below 42.1 Btu/hr-ft-F?

42.07, 41.69, 41.65, 42.40, 42.00, 42.28, 41.31, 42.23, 41.95, 42.30, 42.22, 41.95, 41.86,
41.17, 42.21, 41.07, 41.70, 42.42, 41.71, 42.01, 41.96, 42.32, 42.00, 42.31, 42.46, 41.84,
41.79, 41.55, 42.33, 41.96, 40.65, 42.66, 41.59, 41.99, 42.23, 42.10, 41.67, 41.97, 41.93,
41.99, 41.54, 41.78, 42.04, 42.47, 41.80, 42.04, 41.80, 41.35, 41.94, 41.71, 42.78, 42.52,
42.63, 40.99, 41.49, 42.34, 42.09, 41.50, 41.72, 41.90, 41.61, 41.78, 41.39, 42.55, 41.84)



B.4 Ex: Pavement

Dynamic Cone Penetrometer (DCP) is used to measure material resistance to penetration (mm/blow) as a cone is driven into pavement or subgrade.

Suppose for a particular application, it is required that the true average DCP value for pavement is less than 30.

The pavement will not be used, unless the evidence is shown by the data. Sample of size 52 was taken:

$\bar{X} = 27.76$, $S = 12.2647$

14.1, 14.5, 15.5, 16.0, 16.0, 16.7, 16.9, 17.1, 17.5, 17.8,
17.8, 18.1, 18.2, 18.3, 18.3, 19.0, 19.2, 19.4, 20.0, 20.0,
20.8, 20.8, 21.0, 21.5, 23.5, 27.5, 27.5, 28.0, 28.3, 30.0,
30.0, 31.6, 31.7, 31.7, 32.5, 33.5, 33.9, 35.0, 35.0, 35.0,
36.7, 40.0, 40.0, 41.3, 41.7, 47.5, 50.0, 51.0, 51.8, 54.4,
55.0, 57.0

