Discussion 9: One Proportion CI & Test, 2-sample T

Confidence Interval and Test for An Unknown Proportion π

1. A Department of Energy survey found that 36 out of 100 randomly-selected taxpayers were familiar with the tax incentives for installing energy-saving furnaces. Find a 90% confidence interval for the population proportion of taxpayers who are familiar with the incentives.

2. A 150 lb test weight was placed on each of 50 bathroom scales. 29 scales indicated a weight less than 150, while the other 21 indicated a weight more than 150. Are the data strong evidence that more than half of bathroom scales underestimate weight?

2-Sample t CI & Test (normal populations and equal variances)

Medical researchers wish to test a new antibiotic, labeled A. They will compare it to the old antibiotic labeled B to see whether they are different. They researchers prepare 20 agar plates. which are sterilized and seeded with E. coli. As the antibiotics themselves are produced by modified bacteria, 10 plates will then be seeded again with the bacteria producing antibiotic A and 10 with the bacteria producing B. After 5 days, the percentage of E. coli on each plate (out of total bacteria on that plate) is measured:

$$A: 0.15, 0.13, 0.16, 0.09, 0.23, 0.15, 0.1, 0.27, 0.19, 0.14$$
$$B: 0.24, 0.23, 0.13, 0.15, 0.20, 0.26, 0.19, 0.12, 0.13, 0.17$$

1. Is it reasonable to assume normal populations? Make QQ plots to decide.

2. Is it reasonable to assume equal population variances? Use the appropriate rule of thumb to decide.

3. What kind of test should we perform and why?

4. Conduct the test at level $\alpha = 0.05$ by finding a p-value. Do we reject H_0?

5. Find a 90% confidence interval for the unknown difference of means, $B - A$.