

Ch. 10.2, 12.1, 13.1

1. Consider 20 first year resident female doctors drawn at random from one area whose resting systolic blood pressures measured using an electromagnetic sphygmomanometer were:

128 127 118 115 144 142 133 140 132 131 111 132 149 122
 139 119 136 129 126 128

From previous large studies of women drawn at random from the healthy general public, a resting systolic blood pressure of 120 mm Hg was predicted as the population mean for the relevant age group. Estimate with 95% confidence the true mean systolic blood pressure measurement for females in this age group.

2. A research team is interested in the difference between serum uric acid levels in patients with and without Down’s syndrome. In a large hospital of special needs individuals, a random sample of 12 individuals with Down’s syndrome yielded a mean of 4.5 mg/100 ml and a variance of 1. In a general hospital a random sample of 12 individuals of the same age and gender as the first group and without Down’s syndrome were found to have a mean value of 3.4 mg/100ml with a variance of 1.5. If it is reasonable to assume that the two populations of values are from a Normal distribution, find the 90% confidence interval for the difference in mean levels of serum uric acid in patients with and without Down’s Syndrome. Is there significance evidence at the 5% level to support the claim of a difference in serum uric acid level in patients with and without Down’s Syndrome.

3. The marks for a group of students on a pre-test (before teacher intervention) and on a post-test (after teacher intervention) are given at the right. Is there significant evidence, at a level of 5%, to conclude that the teacher’s interventions helped the students improve their scores on this material?

Student	Before mark	After mark
1	18	22
2	21	25
3	16	17
4	22	24
5	19	16
6	24	29
7	17	20
8	21	23
9	23	19
10	18	20
11	14	15
12	16	15
13	16	18
14	19	26
15	18	18
16	20	24
17	12	18
18	22	25
19	15	19
20	17	16

4. Pizza Company B claims that they have a faster delivery service than Pizza Company A. Is there significant evidence to back up their claim? This is the data collected from a random sample of deliveries of Company A and Company B. Assume the distribution of delivery times is approximate normal. Test their claim at a 10 % significance level.

Delivery time (minutes) for Pizza Company A	20.4	24.2	15.4	21.4	20.2	18.5	21.5
Delivery Time (minutes) for Pizza Company B	20.2	16.9	18.5	17.3	20.5		

5. Assume we have a random sample of 74 cars of a specific model in which we are interested in the miles per gallon for city driving conditions. The manufacturing company reports a mean of more than 20 mpg in the city. Use the following output to test the manufacturer's claim at a 5% significance level.

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
mpg	74	21.2973	.6725511	5.785503	19.9569	22.63769

mean = mean(mpg) t = 1.9289
 Ho: mean = 20 degrees of freedom = 73
 Ha: mean < 20 Ha: mean != 20 Ha: mean > 20
 Pr(T < t) = 0.9712 Pr(|T| > |t|) = 0.0576 Pr(T > t) = 0.0288