

**Assignment – 7**  
**Parmeet Singh Ahluwalia**  
**Stat S-520**

**Answers**

**Ans 1) Trosset 9.6.6:**

The Hypothesis for this question are  $H_0: \mu \geq 800$  vs  $H_1: \mu < 800$ .

The company would not want to waste unnecessary fund and hence would like to minimize Type I error.

The test statistic would be  $(745.1 - 800)/(238/\sqrt{100}) = (-54.9/23.8) = -2.307$ .

For P value,  $P(T_n < -2.307) = 0.0105$ .

Since 0.105 is less than 0.05, he reject the Null Hypothesis.

**Ans 2) Trosset 9.6.7:**

The Hypothesis for this question are  $H_0: \mu = 0$  vs  $H_1: \mu \neq 0$ .

$\alpha = 0.05, s = 5.18644, \bar{x} = -0.1833, n = 60$

$$t = \frac{\bar{x} - \mu}{s/\sqrt{n}} = \frac{-0.1833 - 0}{5.18633/\sqrt{60}} = -0.273765$$

$$p = 2 * \text{pnorm}(-|t|) = 0.7852$$

Hence as it is greater than the significance value, we will reject the alternate hypothesis.

**Ans 3)**

If true proportion is 0.5, we would expect 99% of CI to contain this true proportion. Hence we expect  $0.99 \times 600 = 594$  of CI's to contain 0.5. True Statement.

**Ans 4)**

$$q = \text{qnorm}(0.995) = 2.57582, \sigma = 6, L = 2$$

$$n = (2q\sigma/L)^2 = 238.5863 = 239$$

Hence they should have 239 measurements.

**Ans 5)**

- a) The Null Hypothesis  $H_0: \mu = 0.2$   
The Alternate Hypothesis  $H_1: \mu > 0.2$

- b)  $1 - \text{pbinom}(24, 100, 0.2) = 0.1313532$
- c) No, getting 25 or more right happens 13% of the time even if the person is not a psychic. The statement is not strong enough as the event is not rare for justifying this event.

**Ans 6)**

A 95% confidence interval for the question is given below.

$$0.58 + 1.96 \times \sqrt{0.58 \times \left(\frac{0.42}{1009}\right)} = 0.6104543$$

$$0.58 - 1.96 \times \sqrt{0.58 \times \left(\frac{0.42}{1009}\right)} = 0.5495457$$

The 95% confidence interval ranges from 55% to 61%.