

SOLUTIONS

King Fahd University of Petroleum & Minerals
Department of Mathematics & Statistics
STAT-319-Term063-Quiz6

Name: _____

ID: _____

Serial: _____

A contract with a parts supplier calls for no more than .04 defects in the large shipment of parts. To test whether the shipment meets the contract, the receiving company has selected a random sample of $n = 100$ parts and found 6 defects. If the hypothesis test is to be conducted using a significance level equal to 0.05, then:

The hypotheses are:

a. $H_0: P = 0.04$ $H_A: P > 0.04$ (2-Points)

b. The assumptions are:

1. $n p_0 \geq 5$

2. $n q_0 \geq 5$ (1-Point)

c. The test statistic:

$$Z_c = \frac{\hat{p} - p_0}{\sqrt{\frac{p_0 q_0}{n}}} = \frac{6/100 - 0.04}{\sqrt{\frac{(0.04)(0.96)}{100}}} = 1.02 \text{ (2-Points)}$$

d. The p-value:

$$\begin{aligned} P\text{-value} &= P(Z > Z_c) = P(Z > 1.02) \\ &= 1 - P(Z < 1.02) \quad \text{(1-Point)} \\ &= 1 - 0.8461 = 0.1539 \end{aligned}$$

e. Decision Rule:

Reject H_0 if $P\text{-value} < \alpha \Rightarrow 0.1539 > 0.05$

So, don't reject H_0 (2-Points)

f. Conclusion:

The shipment meets the contract (1-Point)

g. Which type of errors may be occurred?

Because H_0 was NOT rejected, then Type II error may be occurred (1-Point)