

Question #65422, Math / Statistics and Probability

1. A random sample of male employees is taken at the end of a year and the mean number of hours of absenteeism for the year is found to be 63 hours. A similar sample of 50 female employees has a mean of 66 hours. Could these samples be drawn from a population with the same mean and standard deviation of 10 hours? (Use $\alpha = 5\%$)
2. Like two situations where systematic sampling is appropriate. Justify your choice of situations. Also explain how it is different from stratified sampling. Justify
3. Assuming that it is true that 2 in 10 industrial accidents are due to fatigue, find the probability that exactly 2 of 8 industrial accidents will be due to fatigue.

Answer.

1. Null hypothesis $H_0: \mu_1 = \mu_2$

Alternative hypothesis $H_a: \mu_1 \neq \mu_2$

$$\text{Test statistic: } z = \frac{\bar{x}_1 - \bar{x}_2}{\sigma \sqrt{\frac{2}{n}}} = \frac{63 - 66}{10 \sqrt{\frac{2}{50}}} = -1.5.$$

P-value $p = 0.1336$.

Since P-value is greater than 0.05 we can't reject the null hypothesis and should conclude that these samples can be drawn from a population with the same mean.

2. Systematic sampling is better than random sampling when data does not exhibit patterns and there is a low risk of data manipulation by a researcher.

In systematic sampling only the first unit is selected at random and the remaining units are picked in a sequence with equal intervals. In stratified sampling the units are split into groups and then a random sample is picked from each group.

3. Binomial probability with $p = 0.2$, $n = 8$, $x = 2$.

$$P(X = 2) = C_8^2 0.2^2 0.8^6 = 0.2936.$$

Answer provided by www.AssignmentExpert.com