

Answer on Question #63314 – Math – Statistics and Probability

Question

A researcher reports that the average salary of assistant professors is more than £42,000. A sample of 30 assistant professors has a mean salary of £43,260 at $\alpha = 0.05$, test the claim that assistant professors earn more than £42,000 per year. The standard deviation of the population is £ 5,230.

Solution

Since the population standard deviation is known, one can perform Z test.

The null hypothesis: the average salary of assistant professors is less than or equal to £42,000;

$$H_0: \mu \leq 42,000 .$$

The research hypothesis: the average salary of assistant professors is more than £42,000;

$$H_1: \mu > 42,000 \text{ (represents the claim, right-tailed test).}$$

The test statistic:

$$Z = \frac{\bar{X} - \mu}{\sigma/\sqrt{n}} ;$$

$$Z = \frac{43,260 - 42,000}{5,230/\sqrt{30}} = 1.32 .$$

The p -value associated with the determined Z score can be either obtained from the standard normal table, or calculated using the technology (NORM.S.DIST() function of MS Excel).

$$p\text{-value} = P(Z > 1.32) = 0.0935$$

Since the p -value is greater than the significance level $\alpha = 0.05$, fail to reject the null hypothesis. There is no sufficient evidence to support the claim that assistant professors earn more than £42,000 per year at the given significance level $\alpha = 0.05$.

Answer: there is no sufficient evidence to support the claim that assistant professors earn more than £42,000 per year.