Answer on Question #84678 – Math – Statistics and Probability

Question

    Suppose that IQs of adult Canadians follow a normal distribution with standard deviation 15. A random sample of 25 adult Canadians has a mean IQ of 112.
At the 7% level of significance, we would like to test whether the true mean IQ of all adult Canadians is different from 115. What is the P-value for the appropriate test of significance?

Keep 4 decimal places in intermediate calculations and report your final answer to 4 decimal places.

Solution

$H_0: \mu = 115, \qquad H_1: \mu \neq 115$
This is a two-tailed test.

$Sample: n = 25, \overline{x} = 112, s = 15, se = \dfrac{s}{\sqrt{n}} = \dfrac{15}{\sqrt{25}} = 3$

$Test\ Statistic: z = \dfrac{\overline{x} - \mu}{se}$

$z = \dfrac{112 - 115}{3} = -1$

$\alpha = 0.07$

$z_{\alpha/2} = 1.8119$

$p - value = P(Z > |-1|) = 2 \cdot P(Z < -1) = 2 \cdot 0.1587 = 0.3174$

The result is not significant at 7% level of significance.

Answer: 0.3174.