Answer on Question #66354 – Math – Statistics and Probability

Question

A study by consumer Exports showed that 64% of supermarket shoppers believe supermarket brands to be as good as national name brands. To investigate whether this results applies to its own product, the manufacturer of a national name brand Ketch up asked a sample of shoppers whether they believe that super markets Ketchup was as good as the national brand Ketchup.

a. Formulate the hypotheses that could be used to determine whether the percentage of supermarket shoppers who believe that the supermarket Ketchup was as good as the national brand Ketchup differed from 64%.

b. If a sample of 100 shoppers showed 52 stating that the supermarket brand was as good as the national brand what is the P-value?

c. At $\alpha = 0.05$, what is your conclusion?

d. Should the national brand Ketchup manufacturer be pleased with this conclusion? Explain.

Solution

a. Null hypothesis H_0: $p = 0.64$.
Alternative hypothesis H_a: $p \neq 0.64$.

b.
Check
$$np_0 = 100 \cdot 0.64 = 64 > 5$$
$$n(1 - p_0) = 100 \cdot (1 - 0.64) = 100 \cdot 0.36 = 36 > 5$$
Test statistic:
$$z = \frac{0.52 - 0.64}{\sqrt{\frac{0.64 * 036}{100}}} = -2.50.$$
Because this is a two-sided test and $z = -2.50$ is negative,
P-value:
$$p = 2P(Z \leq -2.50) = 2 \cdot 0{,}00621 = 0.01242 < \alpha = 0.05.$$

c. The Null hypothesis should be rejected.

d. There is evidence to suggest that the percentage of supermarket shoppers who believe that the supermarket Ketchup was as good as the national brand Ketchup differs from 64%. Thus, the national brand Ketchup manufacturer should not be pleased with this conclusion, because the results cannot be applied to its own product.