Answer on Question #46750 – Math – Statistics and Probability

Consider the test H_0: $\mu \leq 100$ vs H_1: $\mu > 100$. Suppose that a sample of size $n = 36$ has a sample mean of $\bar{x} = 105$.

(i) Determine the p-value of this outcome if the population standard deviation is known to be $\sigma = 15$.

(ii) Based on the p-value obtained in (i) above for what values of α you would reject H_0

(a) 0.01,

(b) 0.02

(c) 0.06.

You are not expected to perform the test all over again for each value of α; instead conclude based on outcome of (i) above.

Solution

(i)

$$z = \frac{\bar{x} - \mu}{\frac{\sigma}{\sqrt{n}}} = \frac{105 - 100}{\frac{15}{\sqrt{36}}} = 2.$$

$$p - value = P(z > 2) = 0.0228.$$

(ii) **(a)** $\alpha = 0.01$. This p-value is bigger than α, thus we don't reject H_0.

(b) $\alpha = 0.02$. This p-value is bigger than α, thus we don't reject H_0.

(c) $\alpha = 0.06$. This p-value is smaller than α, thus we reject H_0.