**1. BMW Company is testing the top speed of its new model X70.It has tested 100 units and found the avg top speed to be 230Km/hr with a std dev of 10km/hr Whereas company believes the avg top speed to be 260Km/hr.**

**Company asks: Do you think being in Indian Road affects the top speed?**

**Solution # 1:**

Sample Size n = 100

SD σ = 10km/hr

Sample mean µ = 230 km/hr

Considering null hypothesis,there is no difference in the running condition in india & other countries.

Standard Error σ\* = σ / sqrt(n) = 10/10=1

z- score , z\* = (x-µ)/σ\* = (260-230)/1=30

Since the calculated value of z is greater than the standard value (2.58) at 1% level of significance. Hence the null hypothesis is rejected.

Hence Indian Road does affects the top speed.

|  |  |  |  |
| --- | --- | --- | --- |
| Level of significance | 1% | 5% | 10% |
| z critical value for one tailed test | +2.33 or -2.33 | +1.645 or -1.645 | +1.28 or -1.28 |
| z critical value for two tailed test | +2.58 and -2.58 | +1.96 and -1.96 | +1.645 and -1.645 |

**2. On an average, males drink 2L water per day with standard deviation σ = 0.7L. We are**

**planning for a full day trip for 50 Men with 110L of water.**

** What is the probability that we will run out of water?**

** With a Significance level of 5 %, can we say that we will run of water?**

**Solution # 2**

Sample Size n = 50

SD σ = 0.7 L

Sample mean µ = 2.2 L

Standard Error σ\* = σ / sqrt(n) = 0.0989

z- score , z\* = (x-µ)/σ\* = 2.02

Probability that we will run out of water

= P(x<2) = P(z<2.02) =0.5+0.4783=0.9783=97.83%

Considering null hypothesis, no water shortage.

Since the calculated value of z is greater than the standard value (1.96) at 5% level of significance. Hence the null hypothesis is rejected.

Hence we could ran out of water during trip.