**INFERENCES: REJECT PASS HYPOTHESIS FOR MEANS**

Right-tail test Ha has > sign.

If we assume a modified seed will result in a different yield/acre: 2 tails Ho : Ya = Yb

If we suppose that process A is greater than process B: 1 tail Ho : A <= B

If alpha 0.05 the critical Z value is 1.960, the critical value in t with DF = 15 is 2.131.

2 tailed paired t test, with samples of 13 and alpha = 0.05 is: DF = 13-1 = 12 t ( 0.025 , 12 )  = 2.179

**ONE TAIL** The average is 5.00“

A sample of 36 samples gave an average is 4.95 “ and deviation  x =0.252“

Can we state with 95% confidence that the new material is producing shorter means?

Ho 1 >= o Ho 1 >=5 Critical value 1 tail 95 % = alfa = 1-0.95 = 0.05 = 1.645

H1 1 < o H1 1 < 5

A picture containing text

Description automatically generated

Z calc inside area of confidence. Fail to reject Ho. There is not suficient evidence that the mean has decreased. **Z < Z 0 .05**

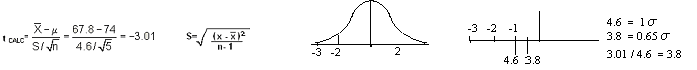
Con un 95% esta de -1.64 .. 1.64 y El Z que nos dio esta dentro del rango, de modo que no se descarta que sigue dentro de la media.

Before 74 minutes average,

The sample gave 70, 62, 65, 74, 78 for 95% we assume new process has lower mean

Ho 1 >= o Ho 1 >=74 Critical value 1 tail 95 % = t = -2.132

H1 1 < o H1 1 < 74



T calc is outside area of confidence Reject the Ho There is evidence that the mean **has decrease**

**If = 4.6 =>  = 4.6; 3.01 = 0.65 **

**An analyst has provided the five replicated analyses for the lead content of properly sampled waste water. What is the 95% confidence interval about these data?**

|  |  |
| --- | --- |
| Sample number | [Pb] (ppm) |
| 1 | 10 |
| 2 | 13 |
| 3 | 9.0 |
| 4 | 10 |
| 5 | 12 |
| **Average** | **10.8** |
| **Mode** | **10** |
| **Median** | **10** |
| **Estimate Standard Deviation from sample** | **1.64** |

10.8 ± t(4, 0.975)\*1.64/ **√** (5). The confidence interval for the average lies between 8.8 and 12.8.

**Critical value of 1.645, if the calculated z statistic is derived from: z statistic calculation**

Z statistic of 1.85 is greater than the critical value, so reject the H0.

In order to test the average output between 2 machines, if is the same or greater a sample of 10 pieces was taken from each, the calculated t-value turned out to be **1.767**. Using a level of significance of 0.05 one tailed test we conclude that DF = 10+10-2 =18 T ( 0.05, **18** ) = **1.734**

Ho 1 >= 2

Ho 1 < 2

Diagram

Description automatically generated DF = 10+10-2 =18 t ( 0.05, **18** ) = **1.734** t calculated was 1.767 Reject Ho because t critic < t calculated

**TWO TAILS** The average daily yield is 880. A new process for 25 days (n=25) with a yield of 900 and s s = 20. Can we say with 95% confidence that the process has changed?

2 tails Ho: o = 1 Critical t for DF = 25-1 for 2 tails t (0.025, 24 ) = 2.064

Chart, diagram

Description automatically generated with medium confidence

It was desired to test the null hypothesis that the means were equal at the 0.05 level of significance. A sample of 5 parts was measure by method 1 and a sample of 7 part with method II. A t-ratio of 2.179 was obtain

2 tails Ho: o = 1 DF = 7+5 -2 = 10 t critic (0.025,10) = 2.228

Chart

Description automatically generated Fail to reject null hypothesis. Ho accepted

Produces 50 units per shift, a new process produce 60 units per shift for 10 consecutive shifts. The highest was 66 units and the lowest shift during the trial was 54 units. What level of confidence can we say the process has changed? new process has different mean

2 tails Ho: o = 1 Range = 66-54 = 12 12 / 6 = S = 2

Chart

Description automatically generated with medium confidence

The critical t value for n-1 ( 9 ) and 99% confidence is 3.250. more than 99% confidence

**If n >30 then apply Z and the level is 0.4772 \* 2 => 95. 44 %**

Process does 50 units, new process does 52 units for 16 samples (DF = 15) with standard deviation of 4 units per shift, what is the level of confidence that the process has change? Ho 1 = 2

Text

Description automatically generated The critical value is between 90% and 95% ( 1.753 - 2.131) around 94%

**If n >0 then apply Z and the level is 0.4772 \* 2 => 95. 44 %**