'Regular' method

Valencia College
Division of Engineering, Computer Programming and Technology
EGN 2440 Probability and Statistics for Engineers
Summer 2015
Instructor: Kwabena Ofosu, Ph.D., P.E.

Name: _____

Quiz 5

Ten small manufacturers in Central Florida qualified for a special credit remediation plan where their management personnel were required to take some financial management classes, as well as technical classes to help improve productivity and quality of their products. Their credit ratings before and 1 year after the program are as follows;

Manufacturer	Credit rating before	Credit rating after
MMG Inc	620	654
P&B Supply Co.	650	655
Kent Partners	643	650
GWH Products	630	703
Dave & Sons	648	639
J.C. LLC	627	642
Ren Inc.	630	695
A. Quintana Sons Co.	667	640
Bradley & Liu Manufacturing	645	627
Kold Kut Precision Inc.	670	675

$\bar{X}_1 = 643$
$S_1 = 16.68$
$\bar{X}_2 = 658$
$S_2 = 25.11$
$n_1 = n_2 = 10$

Conduct a hypothesis test at 95% confidence, to test whether the mean credit rating before the program, and that after the program are the same, or not.](9 points)
[Define the null and alternative hypotheses, determine the rejection region, calculate test statistic or p-value; or construct confidence interval]

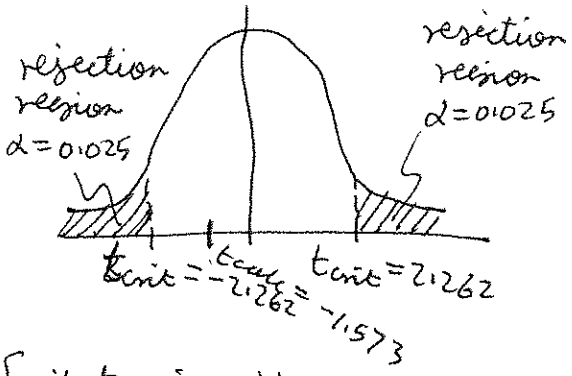
$H_0: \mu_1 - \mu_2 = 0$

$H_a: \mu_1 - \mu_2 \neq 0 \Rightarrow$ ✓ Critical values
- P-values
- CI

$\alpha = 0.05$

$$t_{calc} = \frac{(\bar{X}_1 - \bar{X}_2) - \delta_0}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}} = \frac{(643 - 658) - 0}{\sqrt{\frac{16.68^2}{10} + \frac{25.11^2}{10}}} = -1.573$$

$t_{crit} = t_{\alpha = 0.025, \nu = \min(n_1 - 1, n_2 - 1)}$
$= t_{0.025, 9} = 2.262$



Fail to reject H_0.

Is there sufficient evidence that the credit remediation plan is effective in improving the credit standing of the companies? Explain? (1 points)

There is no difference in credit rating before and after the credit improvement plan. The plan is not effective.

Matched Paired comparisons

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Manufacturer	Credit rating before	Credit rating after	$D_i = X_2 - X_1$
MMG Inc	620	654	34
P&B Supply Co.	650	655	5
Kent Partners	643	650	7
GWH Products	630	703	73
Dave & Sons	648	639	-9
J.C. LLC	627	642	15
Ren Inc.	630	695	65
A. Quintana Sons Co.	667	640	-27
Bradley & Liu Manufacturing	645	627	-18
Kold Kut Precision Inc.	670	675	5

$\bar{D}_i = 15$

$S_{\bar{D}} = 33.19$

$n = 10 \rightarrow$ t-table

Conduct a hypothesis test at 95% confidence, to test whether the mean credit rating before the program, and that after the program are the same, or not.](9 points)
[Define the null and alternative hypotheses, determine the rejection region, calculate test statistic or p-value; or construct confidence interval]

$H_0: \mu_{\bar{D}} = 0 \sim \mu_{0,\bar{D}}$

$H_a: \mu_{\bar{D}} \neq 0 \rightarrow$ Critical values, P values, ✓ CI

$\alpha = 0.05$

$CI = \bar{D}_i \pm t_{\frac{\alpha}{2},\nu} \frac{S_{\bar{D}}}{\sqrt{n}}$

$t_{\frac{\alpha}{2},\nu} = t_{0.025,9} = 2.262$

$95\%\ CI = 15 \pm 2.262 \cdot \frac{(33.19)}{\sqrt{10}}$

$= +15 \pm 23.75$

$= [-8.75, 38.75]$

$\mu_{0,\bar{D}} = 0 \in [-8.75, 38.75]$

Fail to reject H_0!

Is there sufficient evidence that the credit remediation plan is effective in improving the credit standing of the companies? Explain? (1 points)

If we go with H_0 then it means the rating before and after are the same. So the credit plan has no effect on performance.