

RESEARCH METHODS EXAM - 12th of May 2020.

Time: 15:00 hrs.

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WORKINGS OUT - SECTION B

Q1

Sample sizes	Black Rock	Bethmann	DIFF	(DIFF ²)
1	6.2	5.1	-1.1	1.21
2	6.3	5.2	-1.1	1.21
3	5.9	4.9	-1.2	1.44
4	5.5	6.0	0.5	0.25
5	5.6	4.4	-1.2	1.44
6	6.0	4.9	-1.1	1.21
7	6.2	5.3	-0.9	0.81
	<u>35.5</u>	<u>35.6</u>	<u>-0.9</u>	<u>7.57</u>
			mean = -0.9	1.08 mean

Mean Black Rock = $\frac{35.5}{7} = 5.07$ Mean Bethmann = $\frac{35.6}{7} = 5.08$

Black Rock

Variance = $\frac{\sum (x_i - \bar{x})^2}{n-1}$

= $\frac{(6.2-5.07)^2 + (6.3-5.07)^2 + (5.9-5.07)^2 + (5.5-5.07)^2 + (5.6-5.07)^2 + (6.0-5.07)^2 + (6.2-5.07)^2}{6}$

= $\frac{1.28 + 1.51 + 0.7 + 0.2 + 0.3 + 0.9 + 1.3}{6}$

= $\frac{6.19}{6}$

= 1.03

Bethmann

Variance

= $\frac{(5.1-5.08)^2 + (5.2-5.08)^2 + (4.9-5.08)^2 + (6.0-5.08)^2 + (4.4-5.08)^2 + (4.9-5.08)^2 + (5.3-5.08)^2}{6}$

= $\frac{0.0064 + 0.0144 + 0.144 + 0.85 + 0.5 + 0.03 + 0.05}{6}$

= $\frac{1.58}{6}$

Variance = 0.26 or 0.3

$T_{\text{value}} = \frac{\sum D}{\sqrt{\frac{(n \sum D^2) - (\sum D)^2}{n-1}}}$

= $\frac{-4.9}{\sqrt{\frac{(7 \times 7.57) - (-4.9)^2}{7-1}}} = \frac{-4.9}{\sqrt{\frac{77.1}{6}}}$

= $\frac{-4.9}{\sqrt{12.85}} = \frac{-4.9}{3.58}$

= -1.37

2. T-TEST

DIFF	ABSOLUTE DIFF	RANK
-556	556	10
-380	380	5
-407	407	8
-120	120	3
-383	383	7
5	5	1
-62	62	2
-423	423	9
-380	380	6
-256	256	4

$T = 9 + 5 + 7 + 3 + 6 + 2 + 8 + 5 + 4 = 49$

$T = 1$

CRITICAL VALUE OF $P = 0.05$
= 8

$W_{\text{STAT}} = 1$

$W_{\text{CRIT}} = 8$

$W_{\text{STAT}} < W_{\text{CRIT}}$

REJECT H_0

4. RANK

DIFF	RANK	ABSOLUTE
-3	2	2
-4	3	4.8
-4	4	4.8
-4	5	4.8
-4	6	4.8
-4	7	4.8
1	1	1
6	8	8

1	2	3	4	5	6	7	8
1	1	2	3	4	5	6	7
2	7	2	3	4	5	6	7
3	2	2	5	6	7	8	9
4	3	3	7	8	9	10	11
5	5	5	1	1	4	16	16
6	4	4	8	8	4	16	16
7	6	6	5	5	1	1	1
8	8	8	2	2	6	36	36

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