

Find solutions for your homework Search

home / study / math / statistics and probability / statistics and probability questions and answers / six subjects were exposed to 4 treatments and t...

### Question: Six subjects were exposed to 4 treatments and the following ...

Six subjects were exposed to 4 treatments and the following data were recorded.

Subjects	Treatments			
	T1	T2	T3	T4
1	9	5	6	2
2	10	10	3	5
3	8	7	9	10
4	5	6	3	4
5	10	9	8	7
6	5	6	8	9

Test at 0.05 level of significance to test the null hypothesis that there is no significant difference among the six subjects on four different treatments. Use 2 decimal places

STATISTICS: \_\_\_\_  
 COMPUTED VALUE: \_\_\_\_  
 TABULAR VALUE: \_\_\_\_  
 CONCLUSION: \_\_\_\_

Show transcribed image text

### Expert Answer



Priyanka Mali answered this  
820 answers

Was this answer helpful?



#### Post a question

Answers from our experts for your tough homework questions

Enter question

**Continue to post**

20 questions remaining



#### Snap a photo from your phone to post a question

We'll send you a one-time download link

888-888-8888

**Text me**

By providing your phone number, you agree to receive a one-time automated text message with a link to get the app. Standard messaging rates may apply.

#### My Textbook Solutions



DerivaGem  
CD for...  
8th Edition



Corporate  
Finance  
4th Edition



Applied  
Partial...  
5th Edition

[View all solutions](#)





5	10	7	6	9	6
6	3	9	3	8	8
2	5	10	4	7	9
$\sum A = 22$	$\sum B = 28$	$\sum C = 34$	$\sum D = 18$	$\sum E = 34$	$\sum F = 28$

$A^2$	$B^2$	$C^2$	$D^2$	$E^2$	$F^2$
81	100	64	25	100	25
25	100	49	36	81	36
36	9	81	9	64	64
4	25	100	16	49	81
$\sum A^2 = 146$	$\sum B^2 = 234$	$\sum C^2 = 294$	$\sum D^2 = 86$	$\sum E^2 = 294$	$\sum F^2 = 206$

Data table

Group	A	B	C	D	E	F	Total
N	$n_1 = 4$	$n_2 = 4$	$n_3 = 4$	$n_4 = 4$	$n_5 = 4$	$n_6 = 4$	$n = 24$
$\sum x_i$	$T_1 = \sum x_1 = 22$	$T_2 = \sum x_2 = 28$	$T_3 = \sum x_3 = 34$	$T_4 = \sum x_4 = 18$	$T_5 = \sum x_5 = 34$	$T_6 = \sum x_6 = 28$	$\sum x = 164$
$\sum x_i^2$	$\sum x_1^2 = 146$	$\sum x_2^2 = 234$	$\sum x_3^2 = 294$	$\sum x_4^2 = 86$	$\sum x_5^2 = 294$	$\sum x_6^2 = 206$	$\sum x^2 = 1260$
Mean $\bar{x}_i$	$\bar{x}_1 = 5.5$	$\bar{x}_2 = 7$	$\bar{x}_3 = 8.5$	$\bar{x}_4 = 4.5$	$\bar{x}_5 = 8.5$	$\bar{x}_6 = 7$	Overall $\bar{x} = 6.8333$
Std Dev $S_i$	$S_1 = 2.8868$	$S_2 = 3.559$	$S_3 = 1.291$	$S_4 = 1.291$	$S_5 = 1.291$	$S_6 = 1.8257$	

Let k = the number of different samples = 6

$$n = n_1 + n_2 + n_3 + n_4 + n_5 + n_6 = 4 + 4 + 4 + 4 + 4 + 4 = 24$$

$$\text{Overall } \bar{x} = \frac{164}{24} = 6.8333$$

$$\sum x = T_1 + T_2 + T_3 + T_4 + T_5 + T_6 = 22 + 28 + 34 + 18 + 34 + 28 = 164 \quad \dots (1)$$

$$\frac{(\sum x)^2}{n} = \frac{164^2}{24} = 1120.6667 \quad \dots (2)$$

$$\sum \frac{T_i^2}{n_i} = \left( \frac{22^2}{4} + \frac{28^2}{4} + \frac{34^2}{4} + \frac{18^2}{4} + \frac{34^2}{4} + \frac{28^2}{4} \right) = 1172 \quad \dots (3)$$

$$\sum x^2 = \sum x_1^2 + \sum x_2^2 + \sum x_3^2 + \sum x_4^2 + \sum x_5^2 + \sum x_6^2 = 146 + 234 + 294 + 86 + 294 + 206 = 1260 \quad \dots (4)$$

ANOVA:

**Step-1 : sum of squares between samples**

$$SSB = \left( \sum \frac{T_i^2}{n_i} \right) - \frac{(\sum x)^2}{n} = (3) - (2)$$

$$= 1172 - 1120.6667$$

$$= 51.3333$$

Or

$$SSB = \sum n_j \cdot (\bar{x}_j - \bar{x})^2$$

$$= 4 \times (5.5 - 6.8333)^2 + 4 \times (7 - 6.8333)^2 + 4 \times (8.5 - 6.8333)^2 + 4 \times (4.5 - 6.8333)^2 + 4 \times (8.5 - 6.8333)^2 + 4 \times (7 - 6.8333)^2$$

$$= 51.3333$$

**Step-2 : sum of squares within samples**

$$SSW = \sum x^2 - \left( \sum \frac{T_i^2}{n_i} \right) = (4) - (3)$$

$$= 1260 - 1172$$

$$= 88$$

**Step-3 : Total sum of squares**

$$SST = SSB + SSW$$

$$= 51.3333 + 88$$

$$= 139.3333$$

**Step-4 : variance between samples**

$$MSB = \frac{SSB}{k - 1}$$

$$= \frac{51.3333}{5}$$

$$= 10.2667$$

$$= \frac{88}{24 - 6}$$

$$= \frac{88}{18}$$

$$= 4.8889$$

**Step-6 : test statistic F for one way ANOVA test**

$$F = \frac{MSB}{MSW}$$

$$= \frac{10.2667}{4.8889}$$

$$= 2.1$$

the degree of freedom between samples  
 $k - 1 = 5$

Now, degree of freedom within samples  
 $n - k = 24 - 6 = 18$

**ANOVA table**

Source of Variation	Sums of Squares SS	Degrees of freedom DF	Mean Squares MS	F	p-value
Between samples	SSB = 51.33333	$k - 1 = 5$	MSB = 10.2667	2.1	0.1125
Within samples	SSW = 88	$n - k = 18$	MSW = 4.8889		
<b>Total</b>	SST = 139.3333	$n - 1 = 23$			

$H_0$  : There is no significant differentiating between samples

$H_1$  : There is significant differentiating between samples

F(5, 18) at 0.05 level of significance

$$= 2.7729$$

As calculated  $F = 2.1 < 2.7729$

So,  $H_0$  is accepted, Hence there is no significant differentiating between samples

Dear Students,  
 I am waiting for feedback. I have given my 100% to solve your problem. If you satisfied with my answer then please please hit like.  
 Thank You.

Comment >

**Practice with similar questions**

Q: Six subjects were exposed to 4 treatments and the following data were recorded. Subjects T3 T4 12 16 3 2 Treatments IT1 T2 19 1 5 10 10 8 17 5 6 10 9 56 5 10 ∞∞∞∞ 5 7 6 19 Test at 0.05 level of significance to test the null hypothesis that there is no significant difference among the six subjects on four different treatments. Use 2 decimal places in the final answer

A: [See answer](#) 100% (1 rating)

**Up next for you in Statistics and Probability**

Refer to Exhibit 13-6. If at a 5% significance level we want

**Exhibit 13-6**  
 Part of an ANOVA table is shown below.

Source of Variation
Between Treatments
Within Treatments (Error)
Total

[See answer](#)

Sum of Degrees of Mean Squares Freedom 2,073.6 6,000.0 Source of Variation

Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	F
Between Samples	6,000.0	3	2,000.0	1.260
Error	2073.6	16	129.6	
Total		19		

1. The null hypothesis for this ANOVA problem is \_\_\_\_\_  
 A)  $H_0: \mu_1 = \mu_2 = \mu_3 = \mu_4$   
 B)  $H_0: \mu_1 \neq \mu_2 \neq \mu_3 \neq \mu_4$   
 C)  $H_0: \mu_1 = \mu_2 = \mu_3 \neq \mu_4$   
 D)  $H_0: \mu_1 = \mu_2 = \mu_3 = \mu_4 \neq 0$

2. The mean square between treatments equals \_\_\_\_\_  
 A) 2000 B) 1519.41 C) 1200 D) 2829.41

3. The sum of squares for error equals \_\_\_\_\_

[See answer](#)

[See more questions for subjects you study](#)

Q: Six subjects were exposed to 4 treatments and the following data were recorded. Subjects T3 T4 12 16 3 2 Treatments  
T1 T2 19 1 5 10 10 8 17 5 6 10 9 56 5 10 ∞∞∞∞∞∞ 5 7 6 19 Test at 0.05 level of significance to test the null hypothesis  
that there is no significant difference among the six subjects on four different treatments. Use 2 decimal places in the  
final answer

A: [See answer](#) 100% (1 rating)

Q: QUESTION 30 There is some research indicating that college students who use Facebook while studying tend to  
have lower grades than non- users (Kirschner & Karpinski, 2010). A researcher asks a representative sample of college  
students to report their Facebook use and GPA. She classifies students into three groups: Non-user of Facebook  
(Group 1), Rarely Uses Facebook (Group 2), and...

A: [See answer](#)

[Show more](#) ▾

---

COMPANY ▾

---

LEGAL & POLICIES ▾

---

CHEGG PRODUCTS AND SERVICES ▾

---

CHEGG NETWORK ▾

---

CUSTOMER SERVICE ▾



© 2003-2021 Chegg Inc. All rights reserved.