**Anova Formula Problem**

Few problems based on Anova formula are given below:

**Solved Examples**

**Question 1:**Following data is given about cricket teams of three countries:

|  |  |  |  |
| --- | --- | --- | --- |
| Countries | Number of Players | Average Runs | Standard Deviations |
| India | 11 | 60 | 15 |
| New Zealand | 11 | 50 | 10 |
| South Africa | 11 | 70 | 12 |

Find Anova coefficient?  
  
**Solution:**

Construct the following table:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Cricket Teams | n | x | S | S2 |
| India | 11 | 60 | 15 | 225 |
| New Zealand | 11 | 50 | 10 | 100 |
| South Africa | 11 | 70 | 12 | 144 |

n = 11  
p = 3  
N = 33  
x¯ = 60+50+70/3= 60  
SST=∑n(x−x¯)^2  
SST=11(60−60)2+11(50−60)2+11(70−60)2  
= 2200  
MST = SST/p−1  
MST = 2200/3−1  
= 1100  
SSE=∑(n−1)/S^2  
SSE = 10\*225 + 10\*100 + 10\*144  
= 4690  
MSE = SSE/N−p  
MSE = 4690/33−3  
MSE = 156.33  
FF = MST/MSE  
FF = 1100/156.33  
= 7.036

**Question 2:**The following data is given:

|  |  |  |  |
| --- | --- | --- | --- |
| Plant Name | Number of plants | Average Flowers | Standard Deviation |
| Rose | 5 | 12 | 2 |
| Marigold | 5 | 16 | 1 |
| Lily | 5 | 20 | 4 |

Calculate the Anova coefficient.  
  
**Solution:**

Construct the following table:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Plant name | n | x | S | S2 |
| Rose | 5 | 12 | 2 | 4 |
| Marigold | 5 | 16 | 1 | 1 |
| Lily | 5 | 20 | 4 | 16 |

p = 3  
n = 5  
N = 15  
x¯= 16  
SST = ∑n(x−x¯)^2  
SST = 5(12−16)2+5(16−16)2+11(20−16)2  
= 160  
MST = SST/p−1  
MST = 160/3−1  
= 80  
SSE = ∑(n−1)S^2  
SSE = 4\*4 + 4\*1 + 4\*16  
= 84  
MSE = SSE/N−p  
MSE = 841/5−3  
MSE = 7  
FF = MST/MSE  
FF = 80/7  
= 11.429