Sample means for the groups = 48.2, 35.4, 69.8

Step 1: Calculating the group variances

Mean of group1 = 48.2

Group1 square of deviations

51 7.84

45 10.24

33 231.04

45 10.24

67 353.44

Calculating the group variances

Mean of group2 = 35.4

Group2 square of deviations

23 153.76

43 57.76

23 153.76

43 57.76

45 92.16

Calculating the group variances

Mean of group3 = 69.8

Group3 square of deviations

56 190.44

76 38.44

74 17.64

87 295.84

56 190.44

Step2: Calculate the variance of each group i.e 612.8, 515.2, 732.8

Var1 = 612.8/5-1 = 153.2

Var2 = 515.2/5-1 = 128.8

Var3 = 732.8/5-1 = 183.2

MS(error) = 153.2+128.8+183.2/3=155.07

Df(error) = 15-3=12

SS(error) = (155.07)\*(15-3) = 1860.8

Step 3: Calculating the variance of samples

Overall mean = 48.2+35.4+69.8/3 = 51.13

Sample mean of group overall mean squared deviations

48.2 51.13 8.58

35.4 51.13 247.43

69.8 51.13 348.57

Sum of Squares(SS(mean)) = 604.58

Var(mean) = 604.58/3-1 = 302.29

MS(between) = (302.29)\*(5) = 1511.45

Df(groups) = 3-1 = 2

SS(group) = (1511.45)\*(3-1) = 3022.9

Test statistic and critical value

F = 1511.45/155.07 = 9.75

F(critical)(2,12) = 3.89

Group 3022.9

Error 1860.8

Total 4883.7

Size Effect = 3022.9/4883.7 = 0.62

APA, F(2,12) = 9.75

P <0.05 = 0.62