### Using the following data, perform a oneway analysis of variance using α=.05. Write up

### the results in APA format.

[Group1: 51, 45, 33, 45, 67]

[Group2: 23, 43, 23, 43, 45]

[Group3: 56, 76, 74, 87, 56]

* First we will calculate Variance of each set.
* Mean of Set1 = (51+45+33+45+67)/5=48.2, Set2 = (23+43+23+43+45)/5=35.4,

Set2 = (56+76+74+87+56)/5=69.8

Set1:

Value Mean Deviation Square Deviation

51 48.2 2.8 7.84

45 48.2 -3.2 10.24

33 48.2 -15.2 231.04

45 48.2 -3.2 10.24

67 48.2 18.8 353.44

Set2:

Value Mean Deviation Square Deviation

23 35.4 -12.4 153.76

43 35.4 7.6 57.76

23 35.4 -12.4 153.76

43 35.4 7.6 57.76

45 35.4 9.6 92.16

Set3:

Value Mean Deviation Square Deviation

56 69.8 -13.8 190.44

76 69.8 6.2 38.44

74 69.8 4.2 17.64

87 69.8 17.2 295.84

56 69.8 -13.8 190.44

* Sum of Square Deviation for Set1 = 7.84+10.24+231.04+10.24+353.44 = 612.8
* Sum of Square Deviation for Set2 = 153.76+57.76+153.76+57.76+92.16 = 515.2
* Sum of Square Deviation for Set3 = 190.44+38.44+17.64+295.84+190.44 = 732.8

Now Variance of Set1 is Var1 = 612.8/(5-1) = 153.2, Var2 for Set2 = 515.2/(5-1) = 128.8,

Var3 for Set3 = 732.8/(5-1) = 183.2

Mean of Variance (MS) of error = (153.2+128.8+183.2)/3 = 155.06

Degree of Freedom (df) of error = 15 - 3=12

Sum of Square Deviation (SS) for error = MS \* df = 155.06\*12 = 1860.72

Grand Mean out of each Set is (48.2+35.4+69.8)/3 = 51.13

Group Mean Grand Mean Deviation Square Deviation

48.2 51.13 -2.93 8.58

35.4 51.13 -15.73 247.43

69.8 51.13 18.67 348.57

Sum of Square (SS Mean) = 8.58+247.43+348.57 = 604.58

Variance of Mean = 604.58/(3-1) = 302.29

MS between = 302.29 \* 5 = 1511.45

Remaining between group terms of ANOVA table:

Df of group=3-1=2

SS of group = 1511.45\*2=3022.9

Now F test value = 1511.45/155.06 = 9.74

F critical = 3.89

As F test value is greater than F critical means the F test is far away from critical value.

So rejecting null or H0 means accepting HA.

ANOVA table:

Source SS DF MS F

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Group 3022.9 2 1511.45 9.75

Error 1860.72 12 155.06

Total 4,883.62

Effect Size is 3022.9/4883.62 = 0.62

So APA write-up is:

F(2,12) = 9.75 , Level of Significance(p < 0.05), Effect Size=0.62