using the following data, perform e
one way analysis of variance using $\alpha = 0$
write up the result in APA format

Group 1	Group 2	Group 3
51	23	56
45	43	76
33	23	74
45	43	87
67	45	56

sum: 241   177   349

Mean: 48.2   35.4   69.8

Total Sum = 767 (241 + 177 + 349)
Total Mean = 51.13

2) Set up Null and Alternate Hypothesis

$H_0 = \mu_1 = \mu_2 = \mu_3$

$H_A = \mu_1 \neq \mu_2 \neq \mu_3$

$\alpha = 0.05$

$K_{0.05} < F$

If critical value of F from the table is less
than the calculated value of F, we will r
the null Hypothesis.

3) calculate the sum of squares

$$SS_{total} = SS_{between} + SS_{within}$$

group 1	D	D²	Group 2	D	D²	group 3	b	b²
51	2.8	7.84	23	-12.4	153.76	56	-13.8	190.44
45	-3.2	10.24	43	7.6	57.76	76	6.2	38.44
33	-15.2	231.04	23	-12.4	153.76	74	4.2	17.64
45	-3.2	10.24	43	7.6	57.76	87	17.2	295.84
67	18.8	353.44	45	9.6	92.16	56	-13.8	190.44
Sum 241		612.8	177		515.2	349		732.8
Mean 48.2		122.56	35.4		103.04	69.8		146.56

$$SSW = 612.8 + 515.2 + 732.8 = 1860.8$$

$$SSB = \left[(48.2 - 51.13)^2 + (35.4 - 51.13)^2 + (69.8 - 51.13)^2 \right] * $$
$$2 \quad 3022.93$$

each
graph h
5 observat

$$SST = 1860.8 + 3022.93$$
$$= 4883.73$$

4) calculate the Degrees of freedom

$$df\ total = n-1 = (3 \times 5) -1 = 14$$
$$df\ within = n-K = 15 - (no.\ of\ groups)$$
$$= 15 - 3 = 12$$
$$df\ between = K-1 = 3-1 = 2$$

$$df\ total = df\ within + df\ between$$

5) Calculate Mean squares

$$MSB = MS_{between} = \frac{SS_{between}}{df_{between}} = \frac{3022}{2}$$
$$= 1511.47$$

$$MSW = MS_{within} = \frac{SS_{within}}{df_{within}} = \frac{1860}{12} = 155.07$$

6) Calculate F statistics

$$F = \frac{MSB}{MSW} = \frac{1511.47}{155.07} = 9.75$$

From the table of F distribution, critical value of F for 0.05 significance and degrees of freedom $df1 = 12$, $df2 = 2$,

$$F = 3.89$$

Since the calculated value of F is greater than the table value of F, we reject the Null Hypothesis.

So, at least two of the means are significantly different from each other.