Name : Keyur Patel

Roll No : 16010421073

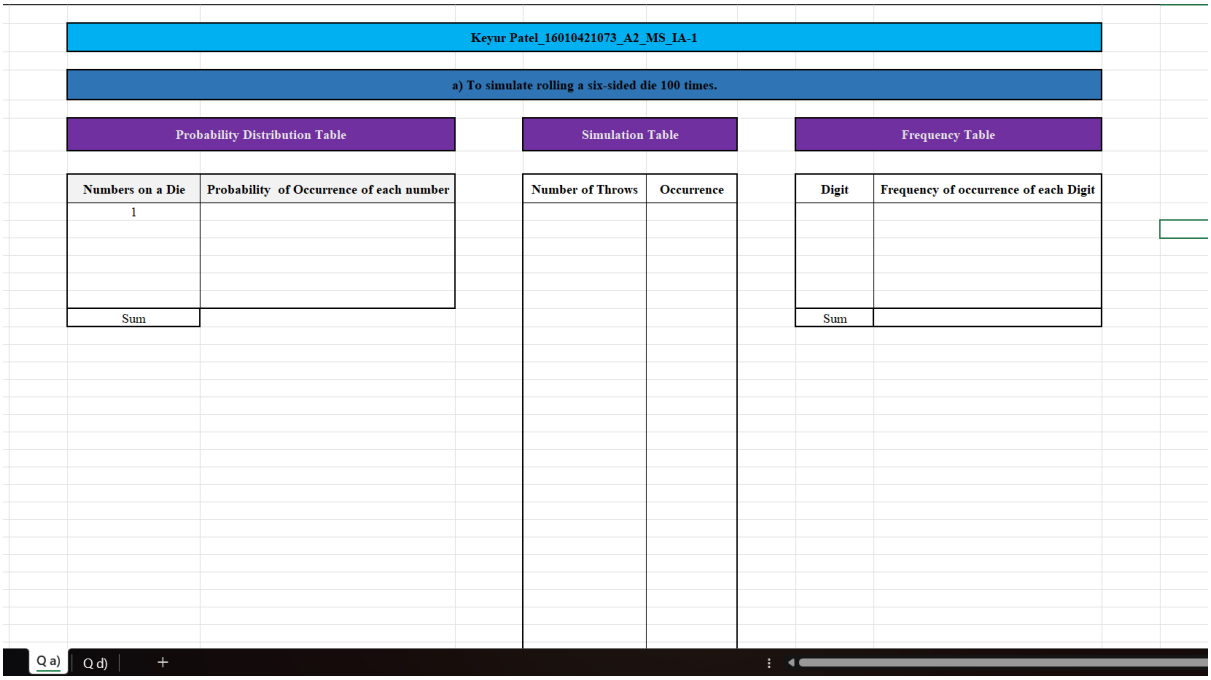
Branch : IT

Batch : A2

MS IA-1

a) To simulate rolling a six-sided die 100 times.

1. Creating required tables and naming the columns



Keyur Patel_16010421073_A2_MS_IA-1

a) To simulate rolling a six-sided die 100 times.

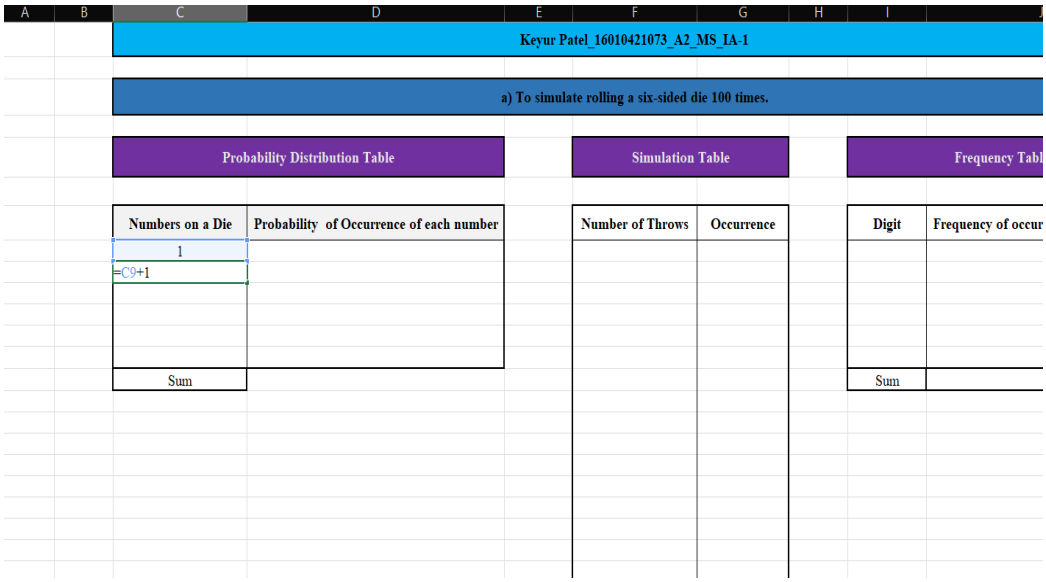
Probability Distribution Table	
Numbers on a Die	Probability of Occurrence of each number
1	
Sum	

Simulation Table	
Number of Throws	Occurrence

Frequency Table	
Digit	Frequency of occurrence of each Digit
Sum	

Q a) Q d) +

2. Applying Formulae to generate-
   Numbers on a die (C9 +1) –

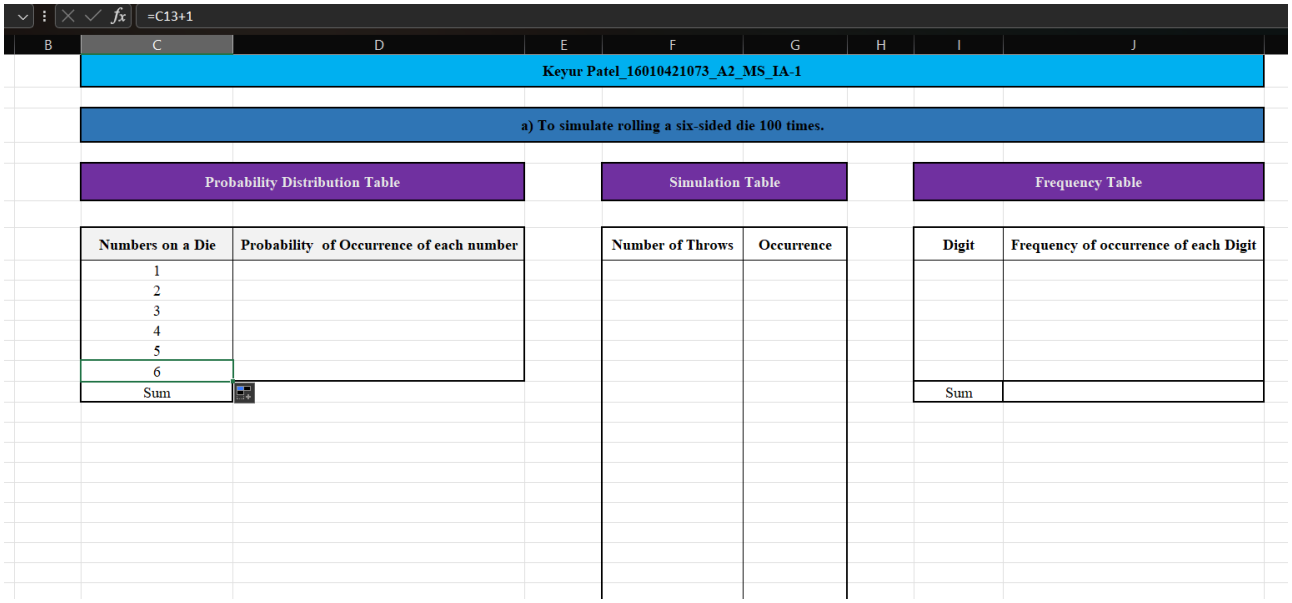


Keyur Patel_16010421073_A2_MS_IA-1

a) To simulate rolling a six-sided die 100 times.

Probability Distribution Table		Simulation Table		Frequency Tabl	
Numbers on a Die	Probability of Occurrence of each number	Number of Throws	Occurrence	Digit	Frequency of occur
1					
=C9+1					
Sum				Sum	

Dragging down-



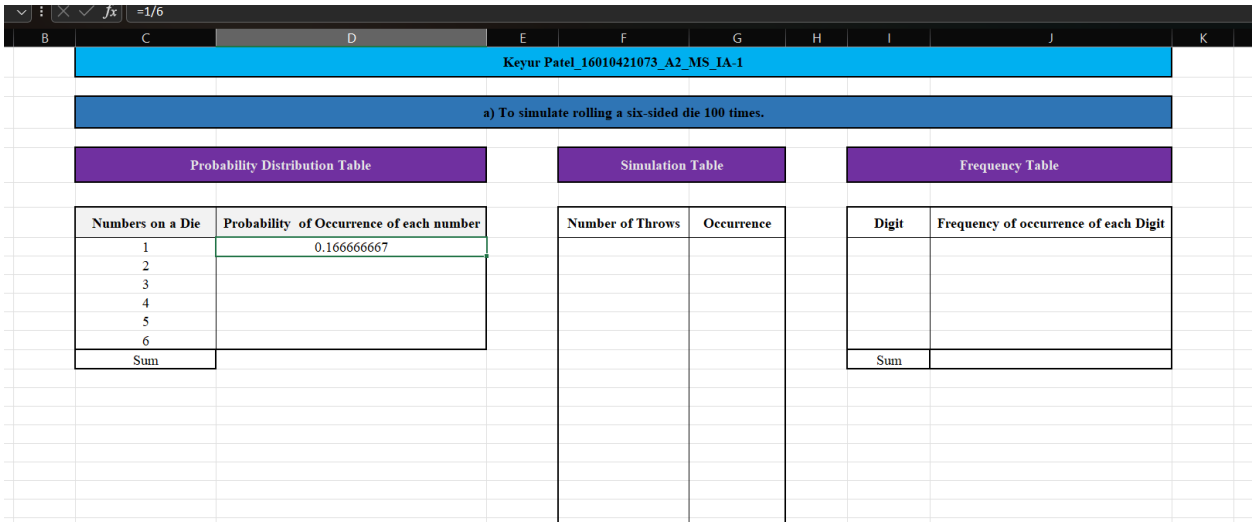
=C13+1

Keyur Patel_16010421073_A2_MS_IA-1

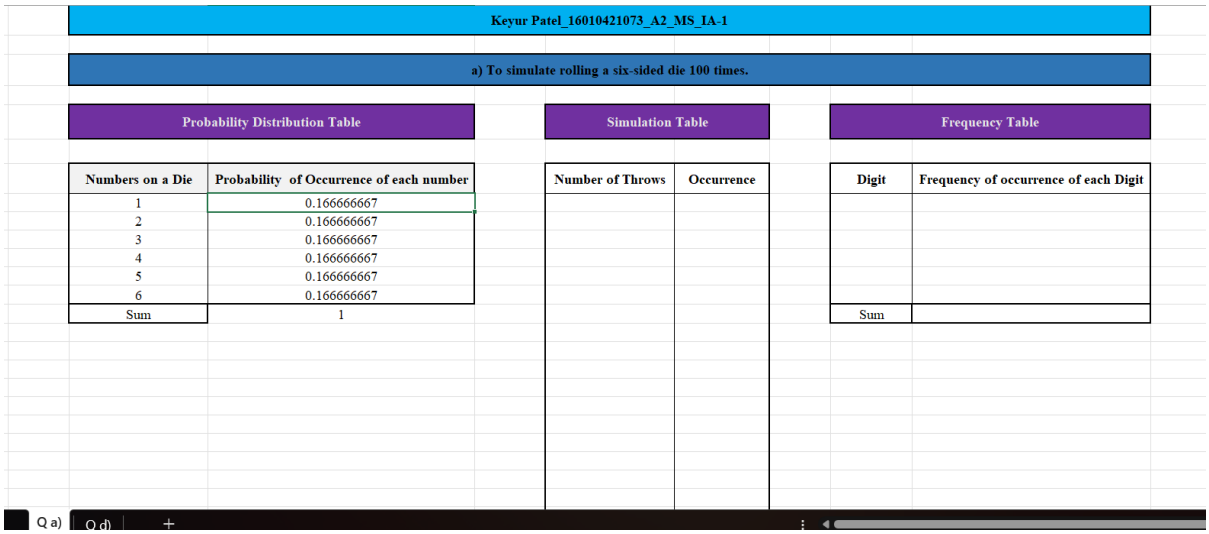
a) To simulate rolling a six-sided die 100 times.

Probability Distribution Table		Simulation Table		Frequency Table	
Numbers on a Die	Probability of Occurrence of each number	Number of Throws	Occurrence	Digit	Frequency of occurrence of each Digit
1					
2					
3					
4					
5					
6					
Sum				Sum	

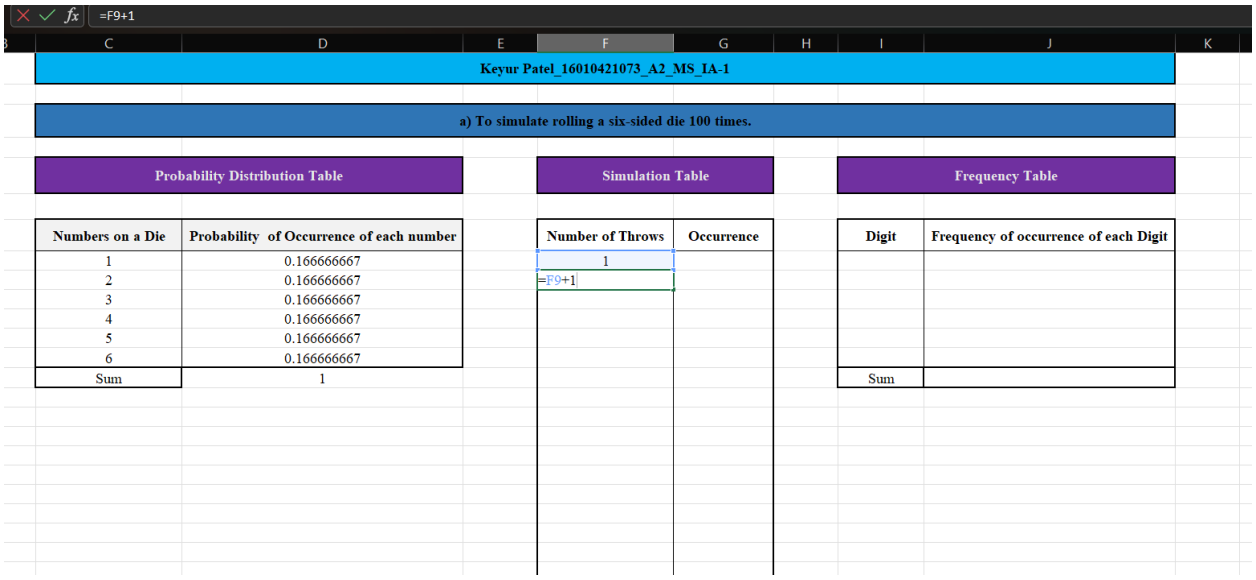
Probability of occurrence of each number =1/6 –



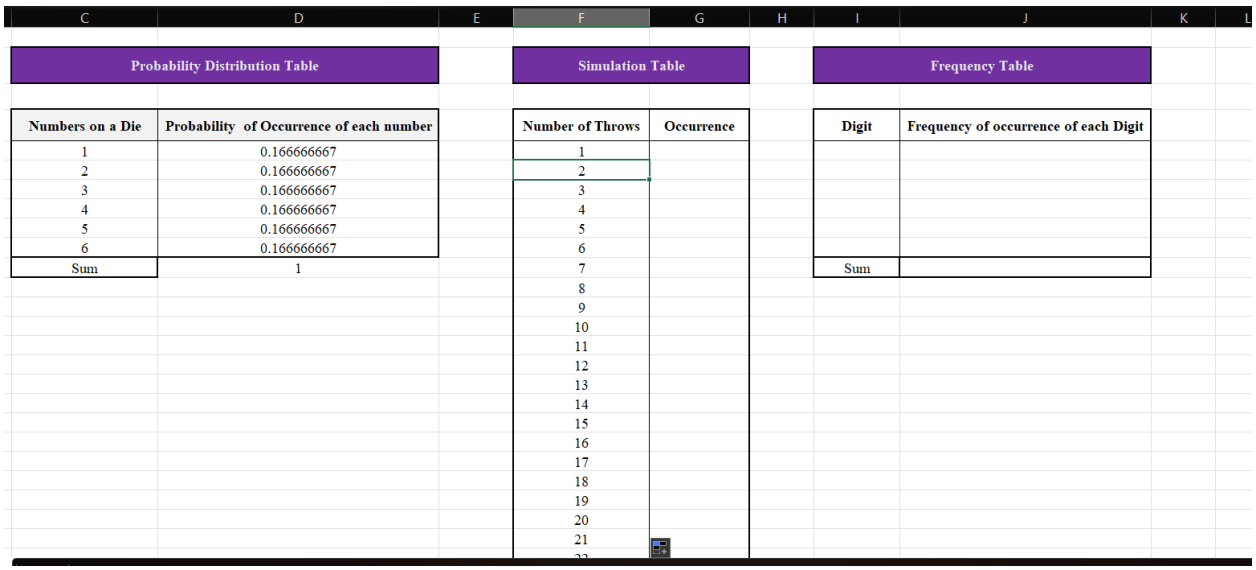
Dragging down –



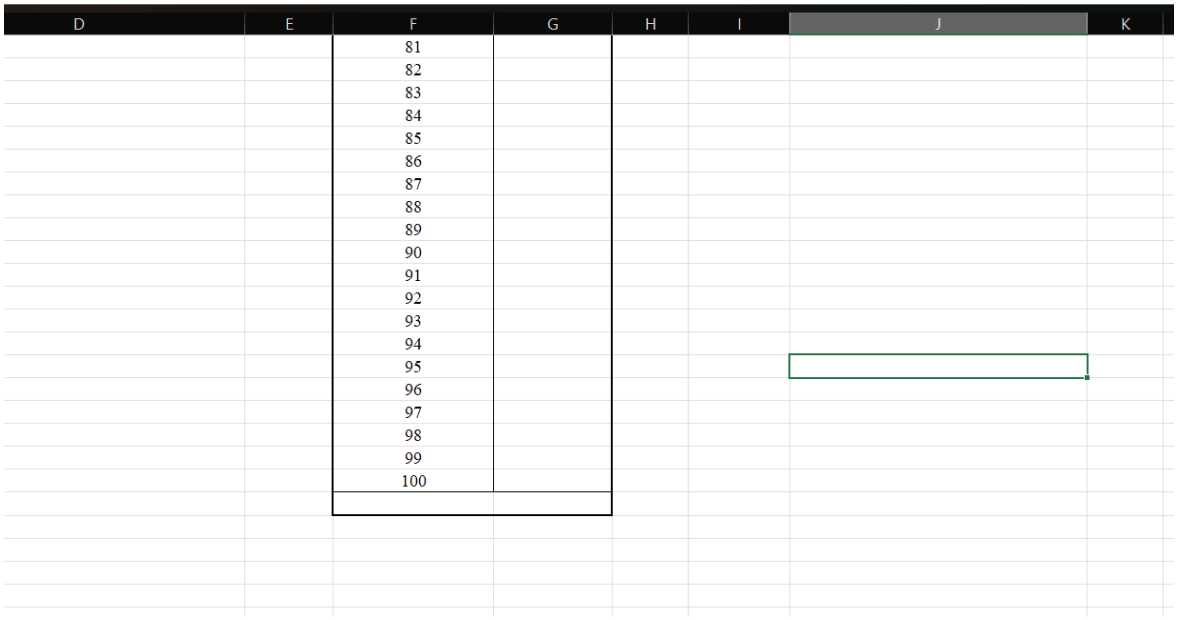
Number of throws (F9+1) –



Dragging down –

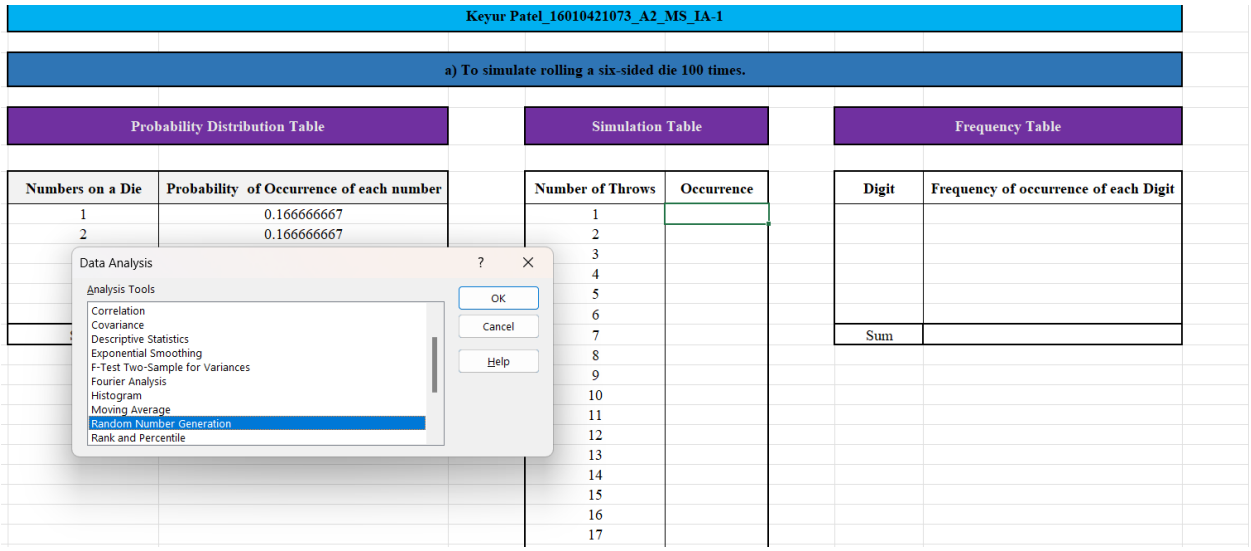


Till 100 –

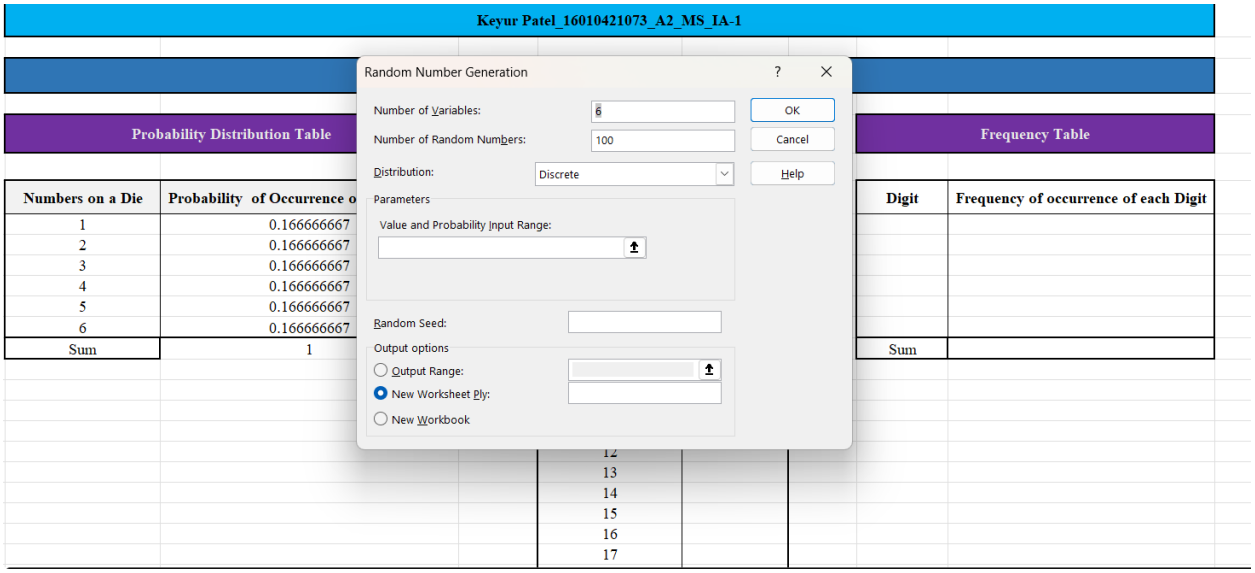


F	G
81	
82	
83	
84	
85	
86	
87	
88	
89	
90	
91	
92	
93	
94	
95	
96	
97	
98	
99	
100	

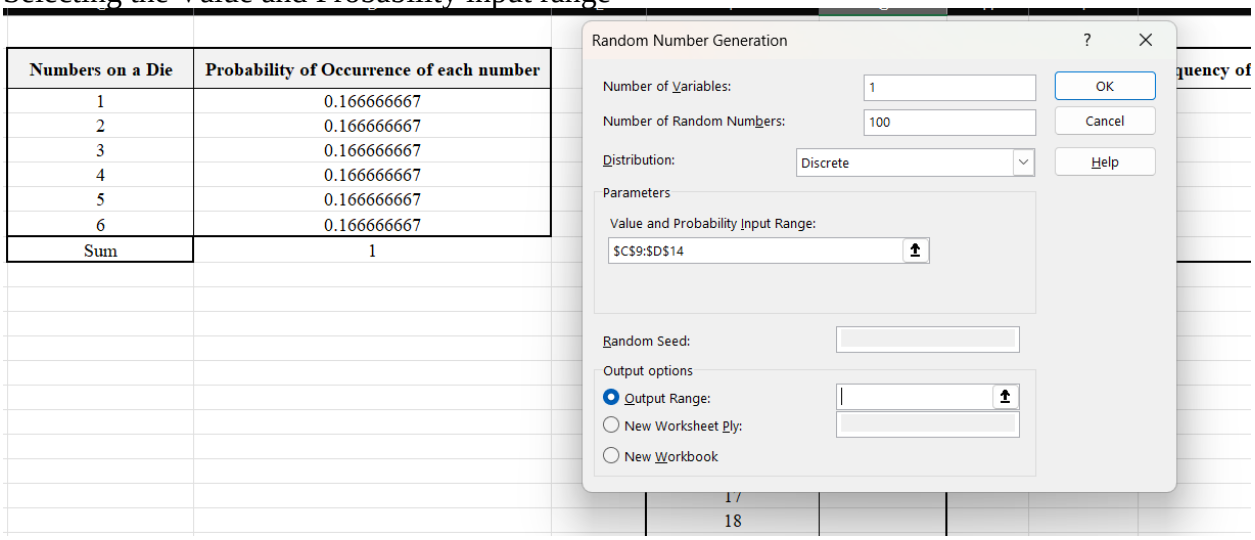
Occurrence –
For occurrence, we will use the “Data Analytics” tool pack in excel.
Selecting Data Analysis option –



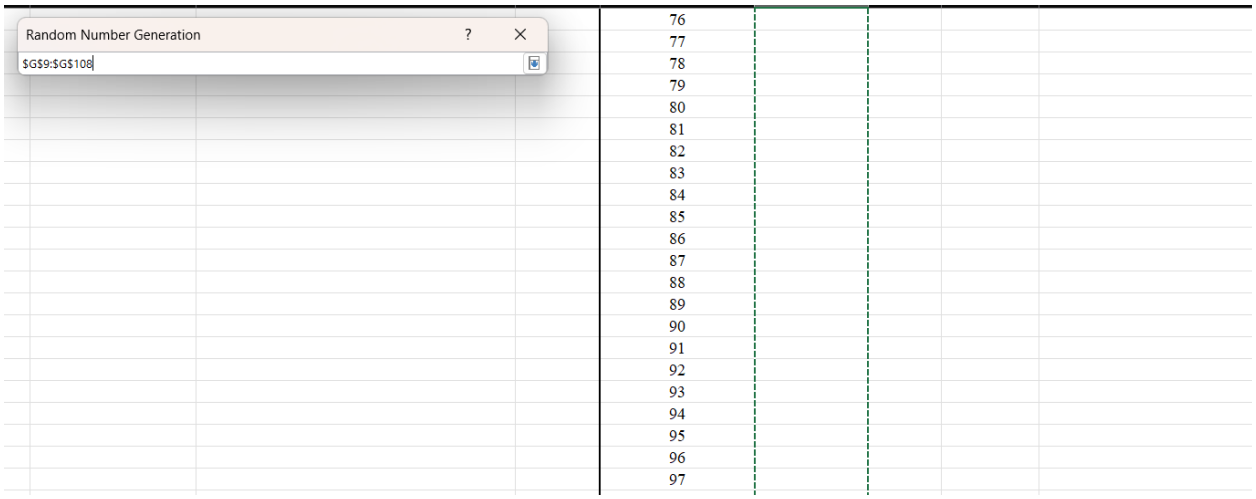
After clicking on “Random Number Generation”-

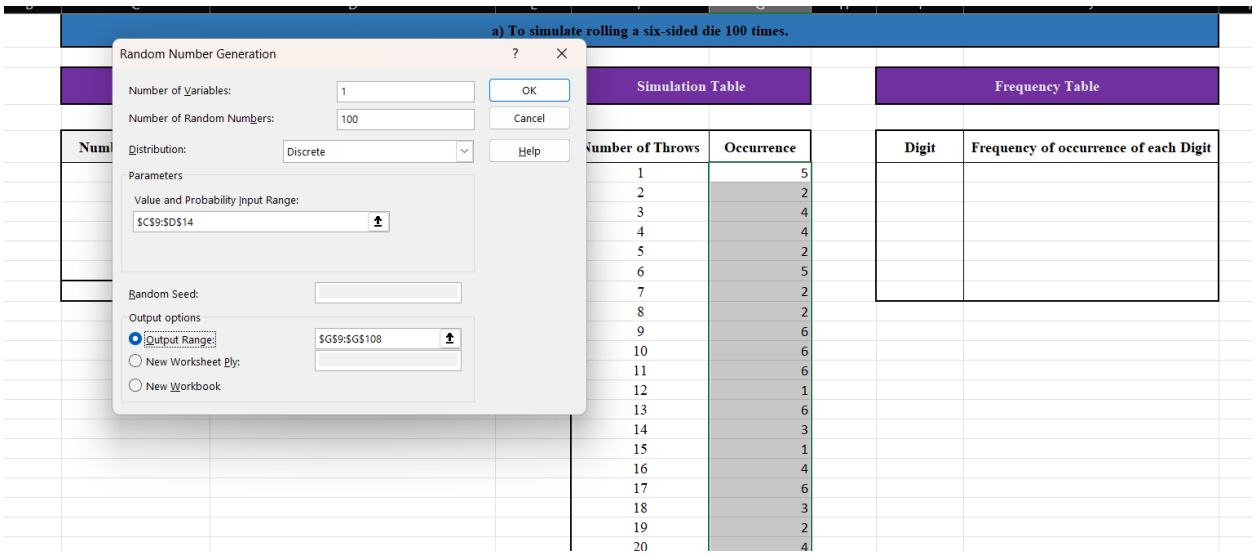


Selecting the Value and Probability input range –



Selecting the Output range –





After clicking on OK, the random numbers get generated –

a) To simulate rolling a six-sided die 100 times.

Probability Distribution Table

Numbers on a Die	Probability of Occurrence of each number
1	0.166666667
2	0.166666667
3	0.166666667
4	0.166666667
5	0.166666667
6	0.166666667
Sum	1

Simulation Table

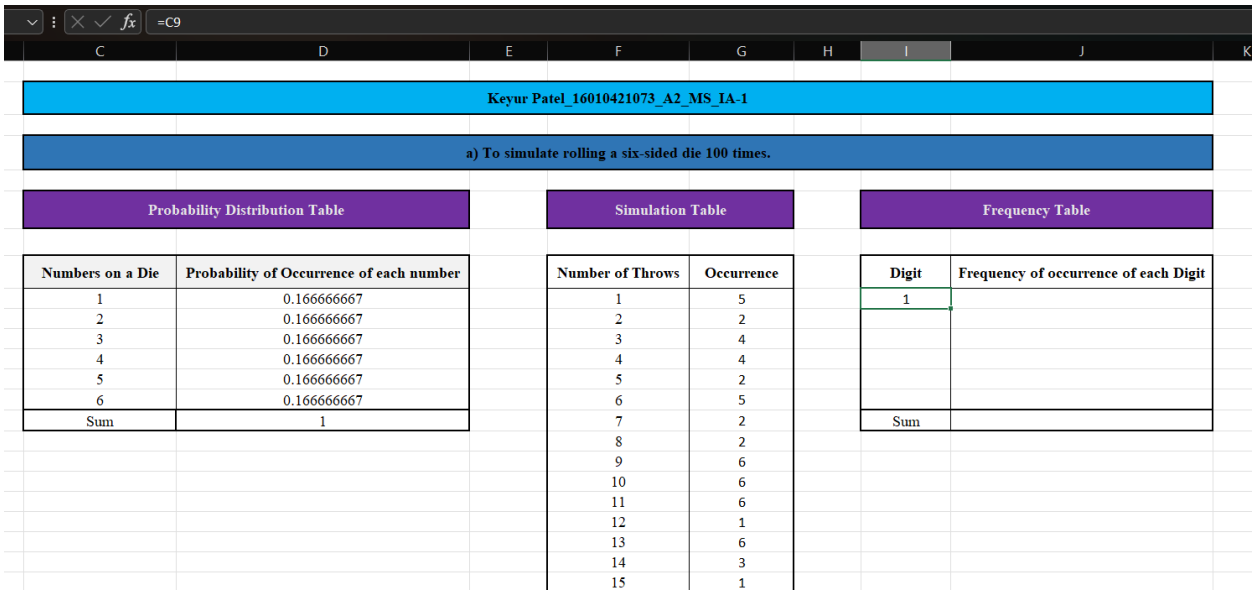
Number of Throws	Occurrence
1	5
2	2
3	4
4	4
5	2
6	5
7	2
8	2
9	6
10	6
11	6
12	1
13	6
14	3
15	1
16	4
17	6
18	3
19	2

Frequency Table

Digit	Frequency of occurrence of each Digit

Frequency & digit – We are doing this to tally our answer which we will get from histogram. This step can be excluded.

Digit –



Dragging down –

Keyur Patel_16010421073_A2_MS_IA-1

a) To simulate rolling a six-sided die 100 times.

Probability Distribution Table

Numbers on a Die	Probability of Occurrence of each number
1	0.166666667
2	0.166666667
3	0.166666667
4	0.166666667
5	0.166666667
6	0.166666667
Sum	1

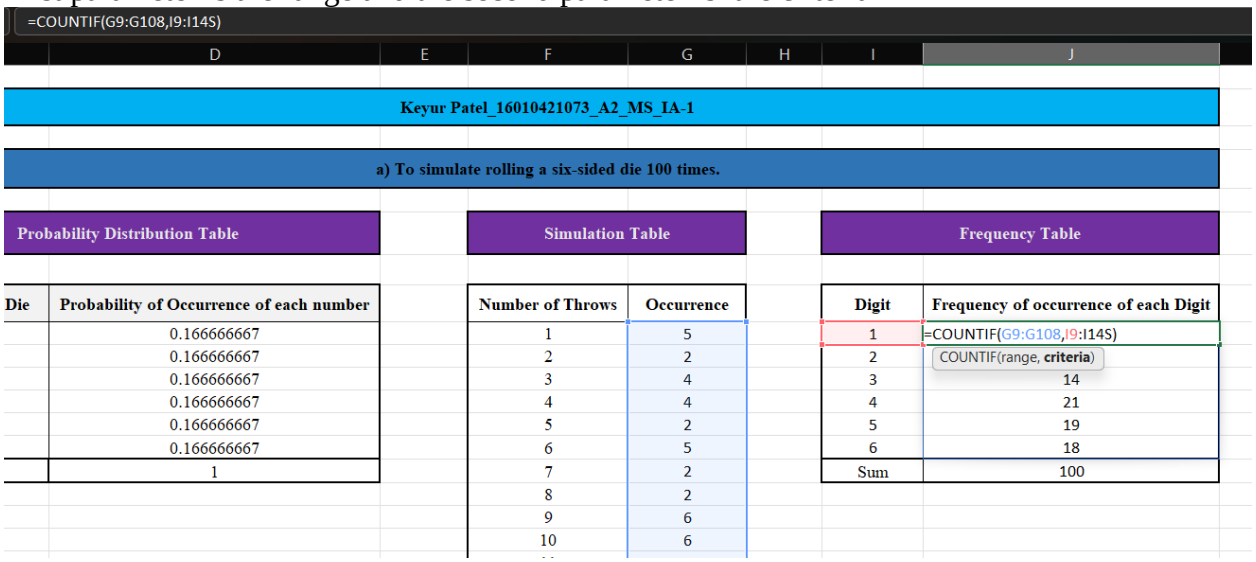
Simulation Table

Number of Throws	Occurrence
1	5
2	2
3	4
4	4
5	2
6	5
7	2
8	2
9	6
10	6
11	6
12	1
13	6
14	3

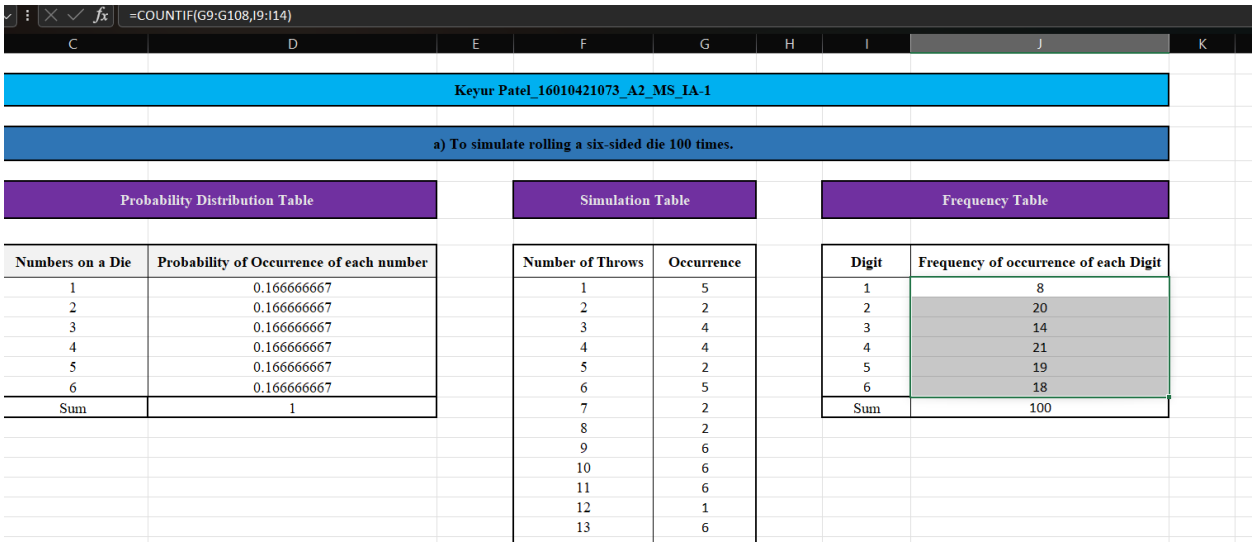
Frequency Table

Digit	Frequency of occurrence of each Digit
1	
2	
3	
4	
5	
6	
Sum	

Frequency of occurrence of each digit –
We will use “COUNTIF” function of excel to calculate frequency of each digit.
First parameter is the range and the second parameter is the criteria



Dragging down –



=COUNTIF(G9:G108,I9:I14)

Keyur Patel_16010421073_A2_MS_IA-1

a) To simulate rolling a six-sided die 100 times.

Probability Distribution Table

Numbers on a Die	Probability of Occurrence of each number
1	0.166666667
2	0.166666667
3	0.166666667
4	0.166666667
5	0.166666667
6	0.166666667
Sum	1

Simulation Table

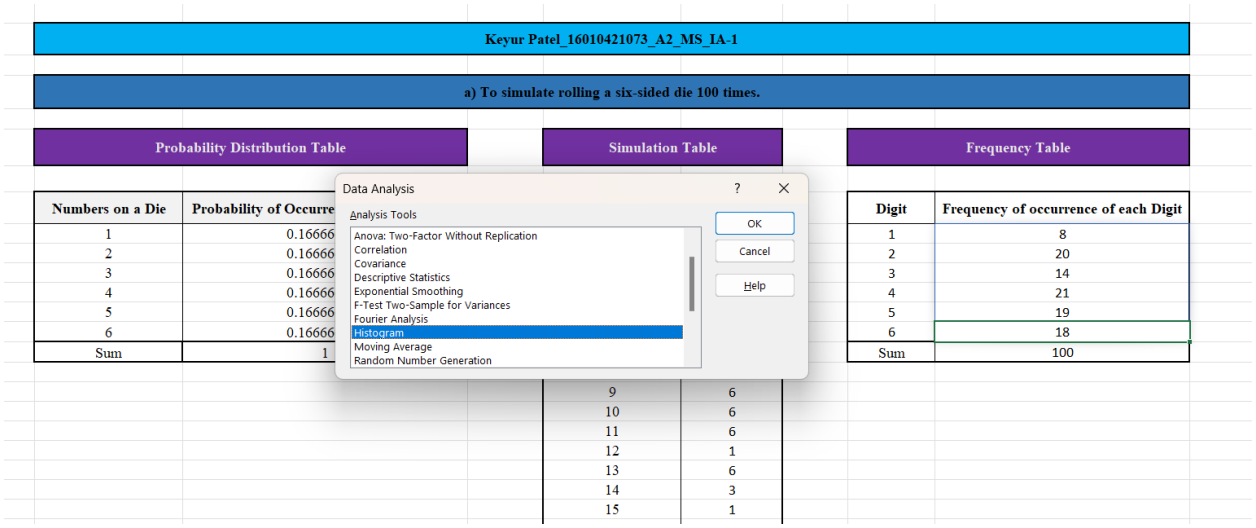
Number of Throws	Occurrence
1	5
2	2
3	4
4	4
5	2
6	5
7	2
8	2
9	6
10	6
11	6
12	1
13	6

Frequency Table

Digit	Frequency of occurrence of each Digit
1	8
2	20
3	14
4	21
5	19
6	18
Sum	100

3. Creating a Histogram

For this again we will use “Data Analysis” tool pack in excel.



Keyur Patel_16010421073_A2_MS_IA-1

a) To simulate rolling a six-sided die 100 times.

Probability Distribution Table

Numbers on a Die	Probability of Occurre
1	0.16666
2	0.16666
3	0.16666
4	0.16666
5	0.16666
6	0.16666
Sum	1

Simulation Table

9	6
10	6
11	6
12	1
13	6
14	3
15	1

Frequency Table

Digit	Frequency of occurrence of each Digit
1	8
2	20
3	14
4	21
5	19
6	18
Sum	100

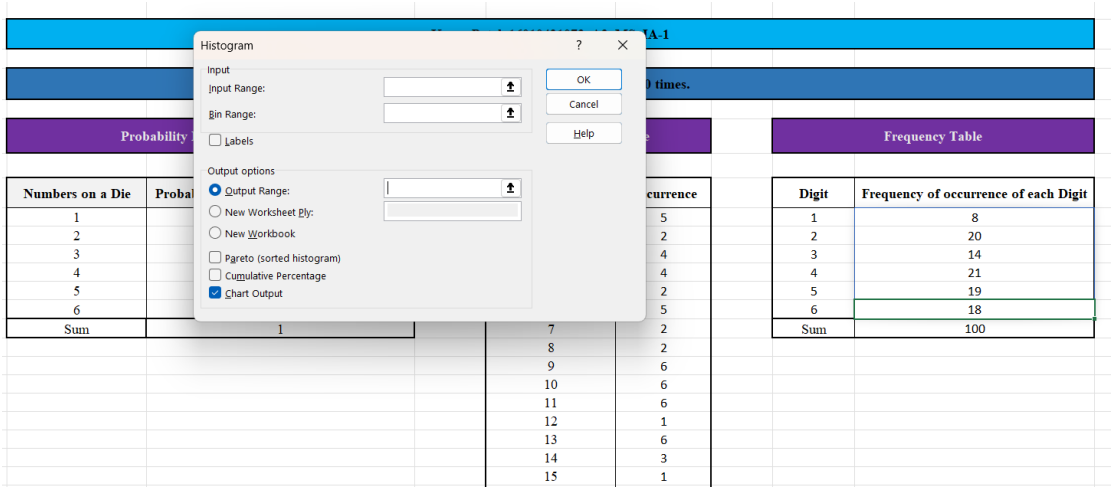
Data Analysis

Analysis Tools

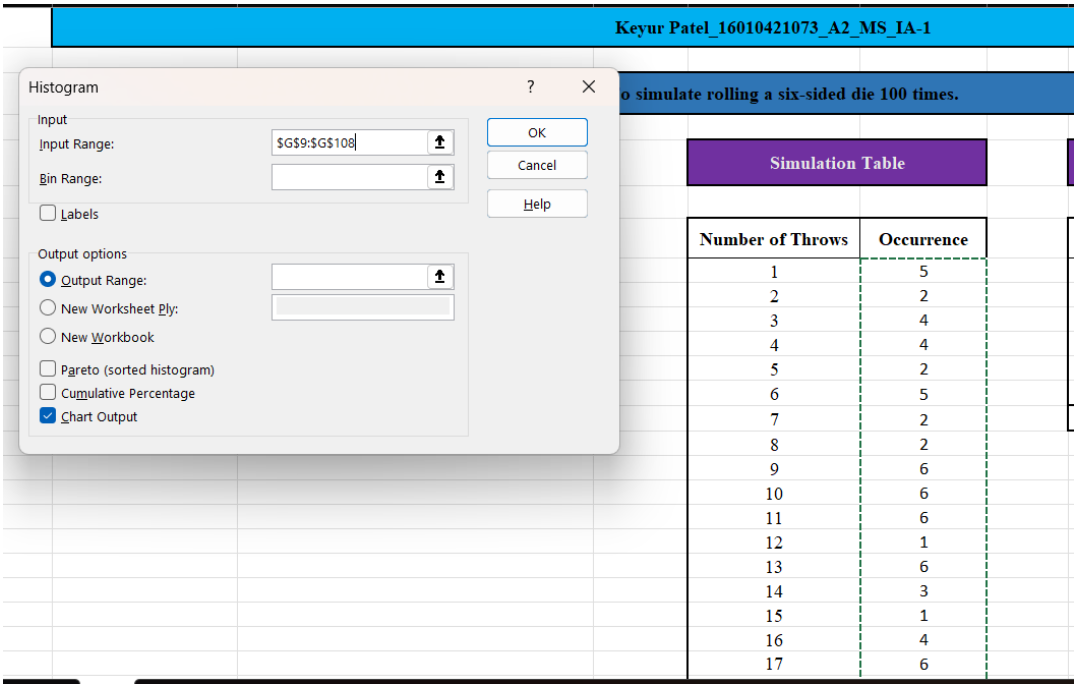
- Anova: Two-Factor Without Replication
- Correlation
- Covariance
- Descriptive Statistics
- Exponential Smoothing
- F-Test Two-Sample for Variances
- Fourier Analysis
- Histogram
- Moving Average
- Random Number Generation

OK | Cancel | Help

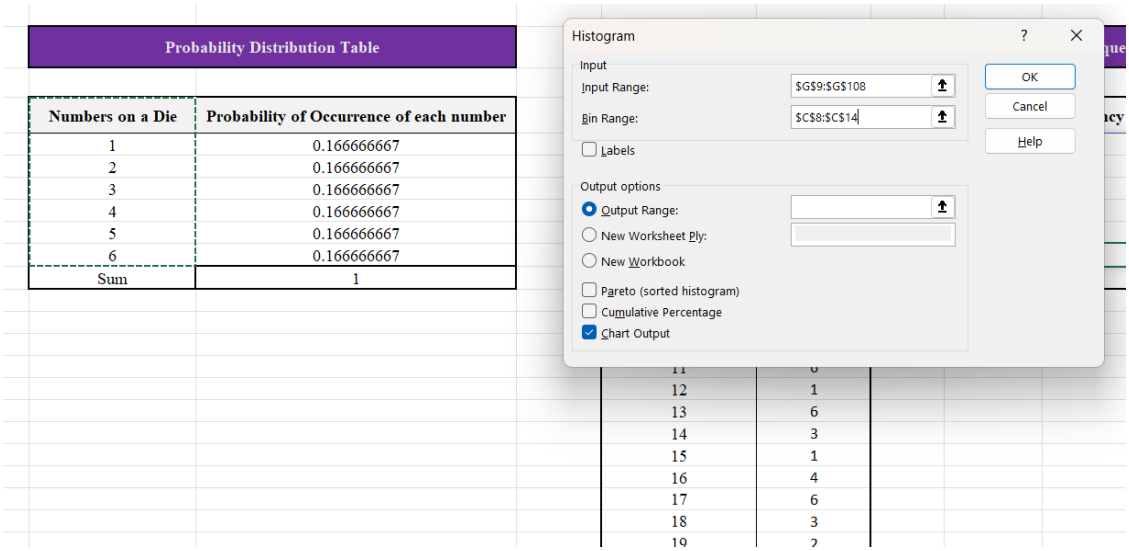
After clicking on “OK” –



Selecting the input range –



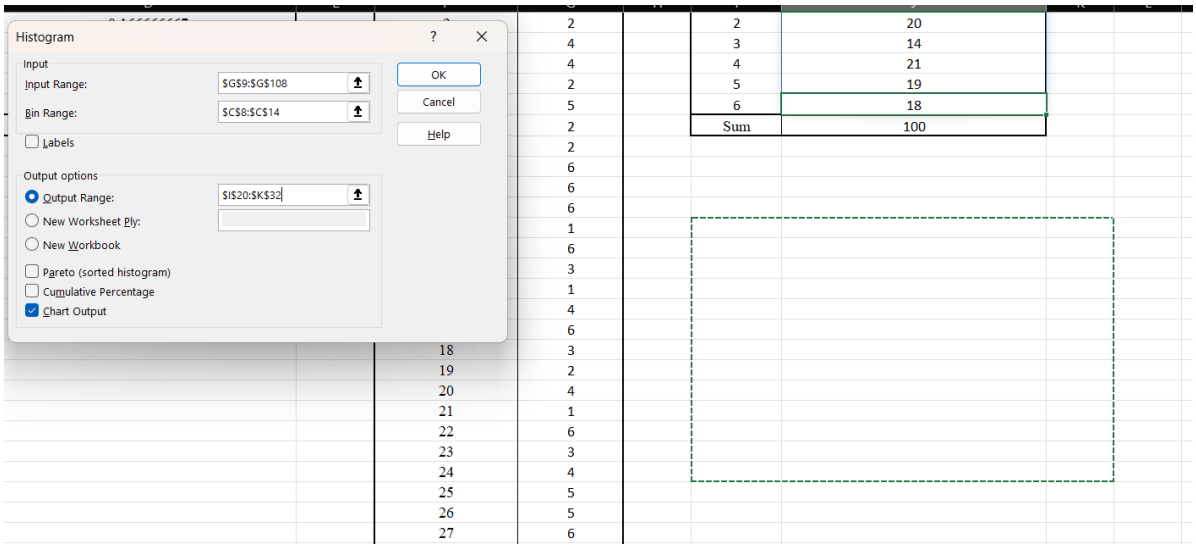
Selecting bin range –



Probability Distribution Table	
Numbers on a Die	**Probability of Occurrence of each number**
1	0.166666667
2	0.166666667
3	0.166666667
4	0.166666667
5	0.166666667
6	0.166666667
Sum	1

12	1
13	6
14	3
15	1
16	4
17	6
18	3
19	2

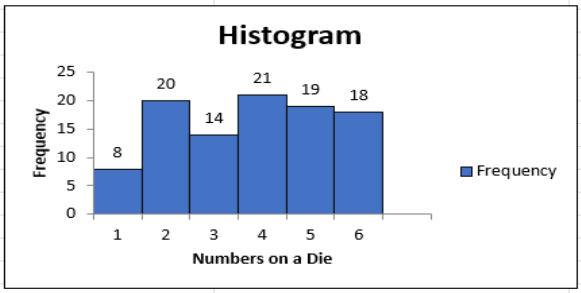
Selecting the output range –



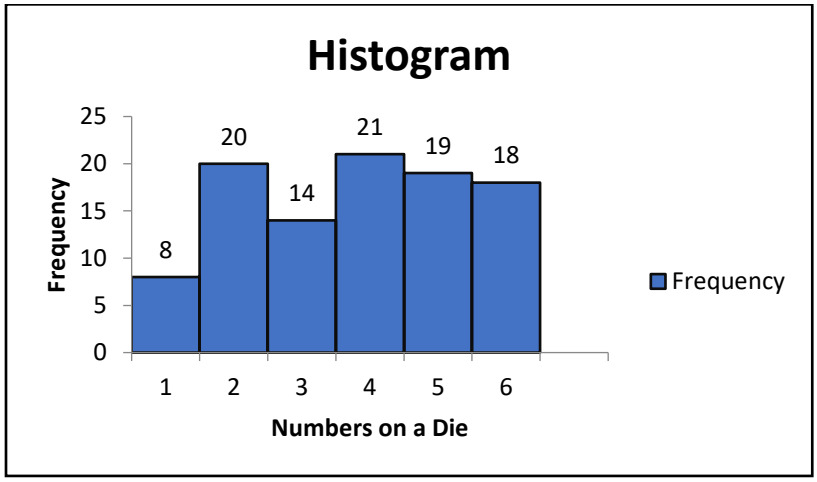
2	20
3	14
4	21
5	19
6	18
Sum	100

After clicking on “OK” –

Numbers on a Die	*Frequency*
1	8
2	20
3	14
4	21
5	19
6	18



Hence this is the final histogram –

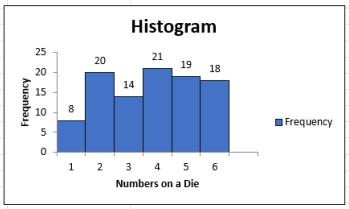


4. Final

a) To simulate rolling a six-sided die 100 times.

Probability Distribution Table

Numbers on a Die	Probability of Occurrence of each number
1	0.166666667
2	0.166666667
3	0.166666667
4	0.166666667
5	0.166666667
6	0.166666667
Sum	1



Simulation Table

Number of Throws	Occurrence
1	5
2	2
3	4
4	4
5	2
6	5
7	2
8	2
9	6
10	6
11	6
12	1
13	6
14	3
15	1
16	4
17	6
18	3
19	2
20	4
21	1
22	6
23	3
24	4

Frequency Table

Digit	Frequency of occurrence of each Digit
1	8
2	20
3	14
4	21
5	19
6	18
Sum	100

Numbers on a Die	*Frequency*
1	8
2	20
3	14
4	21
5	19
6	18

d) To simulate rolling two six-sided dice and recording the sum 250 times.

Creating required tables and naming the columns

Keyur Patel_16010421073_A2_MS_IA-1

d) To simulate rolling two six-sided dice and recording the sum 250 times.

Probability Distribution Table

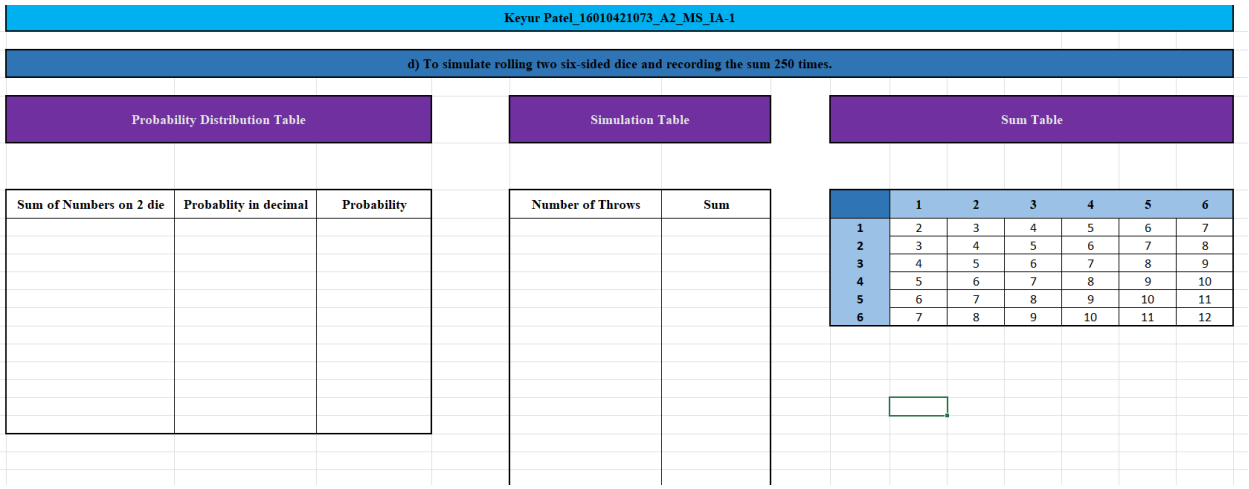
Sum of Numbers on 2 die	Probablity in decimal	Probability

Simulation Table

Number of Throws	Sum

Sum Table

1) To find the probability of occurrence of sum of each digit, we need to make a sum table as follows –



Keyur Patel_16010421073_A2_MS_IA-1

d) To simulate rolling two six-sided dice and recording the sum 250 times.

Probability Distribution Table

Sum of Numbers on 2 die	Probablity in decimal	Probability

Simulation Table

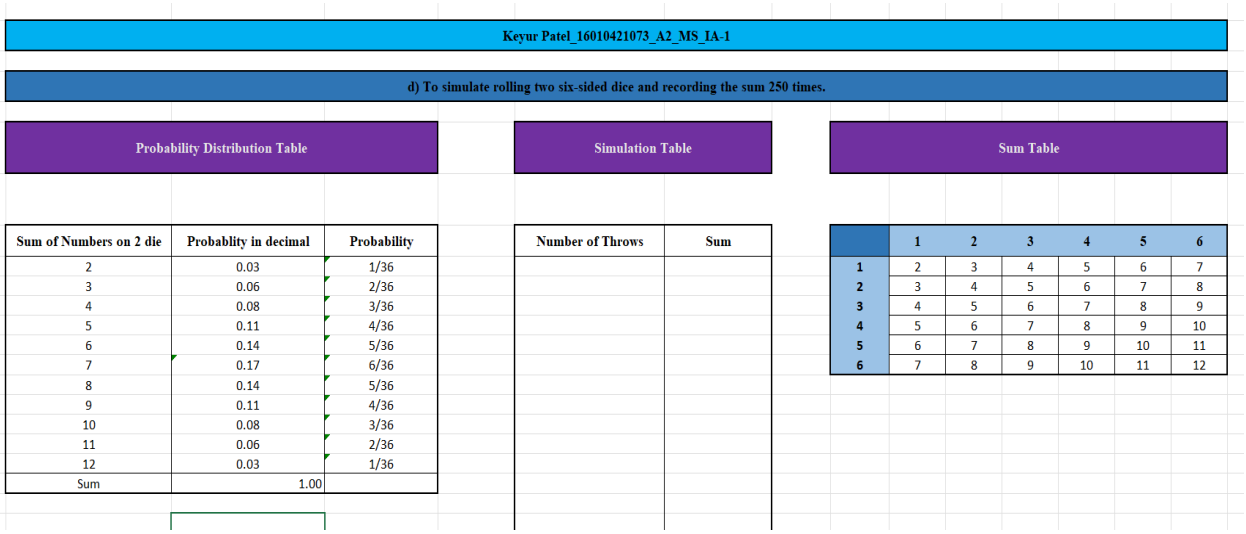
Number of Throws	Sum

Sum Table

	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12

The light blue numbers depict the digits on 2 dies and white cell digits depicts the sum.

2) Based on the sum table, we can calculate the probability of occurrence of sum of each digit for numbers from 2-12 –



Keyur Patel_16010421073_A2_MS_IA-1

d) To simulate rolling two six-sided dice and recording the sum 250 times.

Probability Distribution Table

Sum of Numbers on 2 die	Probablity in decimal	Probability
2	0.03	1/36
3	0.06	2/36
4	0.08	3/36
5	0.11	4/36
6	0.14	5/36
7	0.17	6/36
8	0.14	5/36
9	0.11	4/36
10	0.08	3/36
11	0.06	2/36
12	0.03	1/36
Sum	1.00	

Simulation Table

Number of Throws	Sum

Sum Table

	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12

As seen from the sum table, there are total 36 possibilities. We count the number of times each digit has appeared and then divide it by 36 to get the probability.

3) Applying Formulae to generate-

Number of throws –

Probability Distribution Table

Sum of Numbers on 2 die	Probablity in decimal	Probability
2	0.03	1/36
3	0.06	2/36
4	0.08	3/36
5	0.11	4/36
6	0.14	5/36
7	0.17	6/36
8	0.14	5/36
9	0.11	4/36
10	0.08	3/36
11	0.06	2/36
12	0.03	1/36
Sum	1.00	

Simulation Table

Number of Throws	Sum
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	

Sum Table

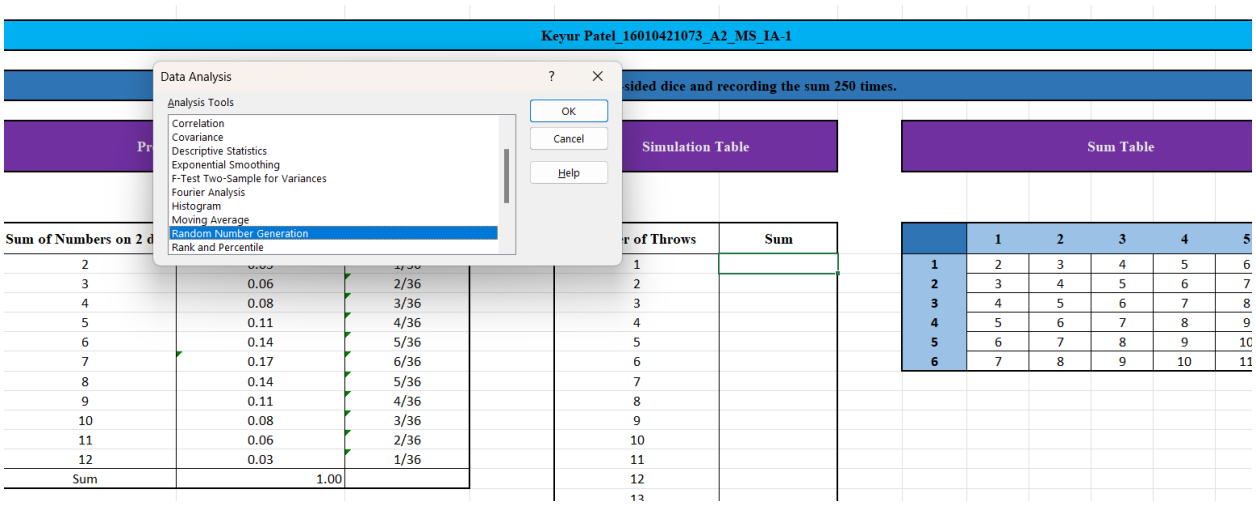
	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12

Till 250 –

228	
229	
230	
231	
232	
233	
234	
235	
236	
237	
238	
239	
240	
241	
242	
243	
244	
245	
246	
247	
248	
249	
250	

Sum –

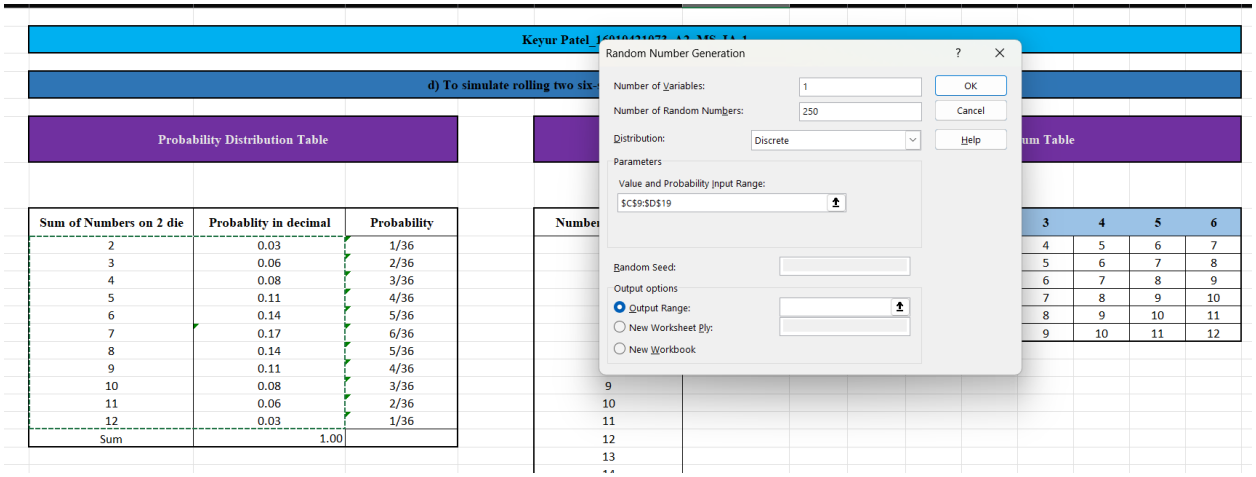
To simulate the sum, we will use the “Data Analytics” tool kit of excel.



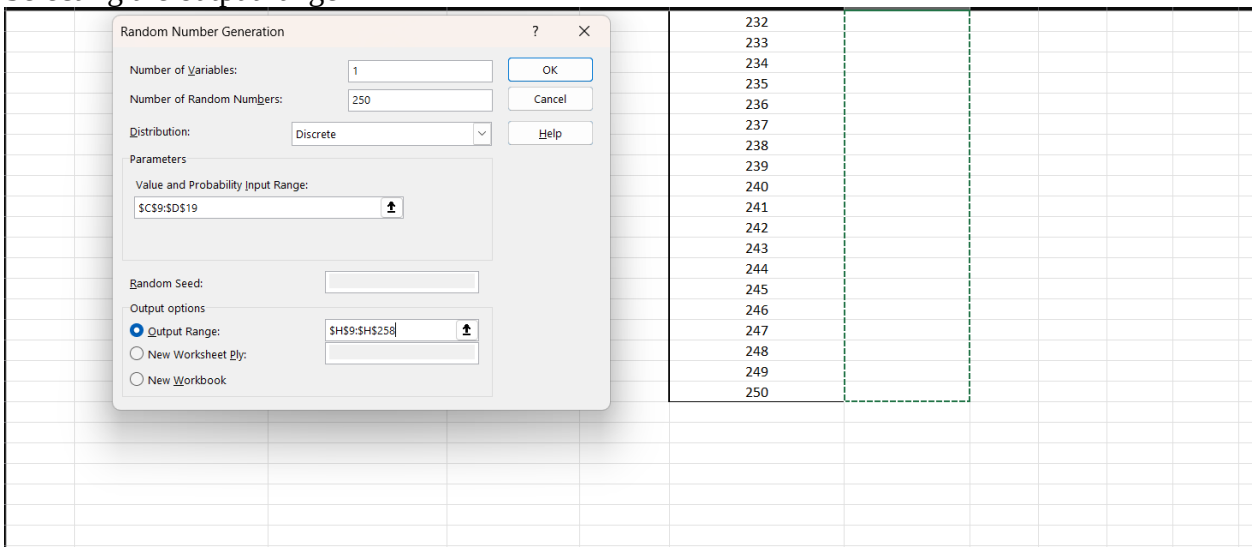
Sum of Numbers on 2 die	Probablity in decimal	Probability
2	0.03	1/36
3	0.06	2/36
4	0.08	3/36
5	0.11	4/36
6	0.14	5/36
7	0.17	6/36
8	0.14	5/36
9	0.11	4/36
10	0.08	3/36
11	0.06	2/36
12	0.03	1/36
Sum	1.00	

	1	2	3	4	5
1	2	3	4	5	6
2	3	4	5	6	7
3	4	5	6	7	8
4	5	6	7	8	9
5	6	7	8	9	10
6	7	8	9	10	11

Selecting the value and probability range –



Selecting the output range –



After clicking on “OK” , random numbers for sum get generated–

Probability Distribution Table

Sum of Numbers on 2 die	Probablity in decimal	Probability
2	0.03	1/36
3	0.06	2/36
4	0.08	3/36
5	0.11	4/36
6	0.14	5/36
7	0.17	6/36
8	0.14	5/36
9	0.11	4/36
10	0.08	3/36
11	0.06	2/36
12	0.03	1/36
Sum	1.00	

Simulation Table

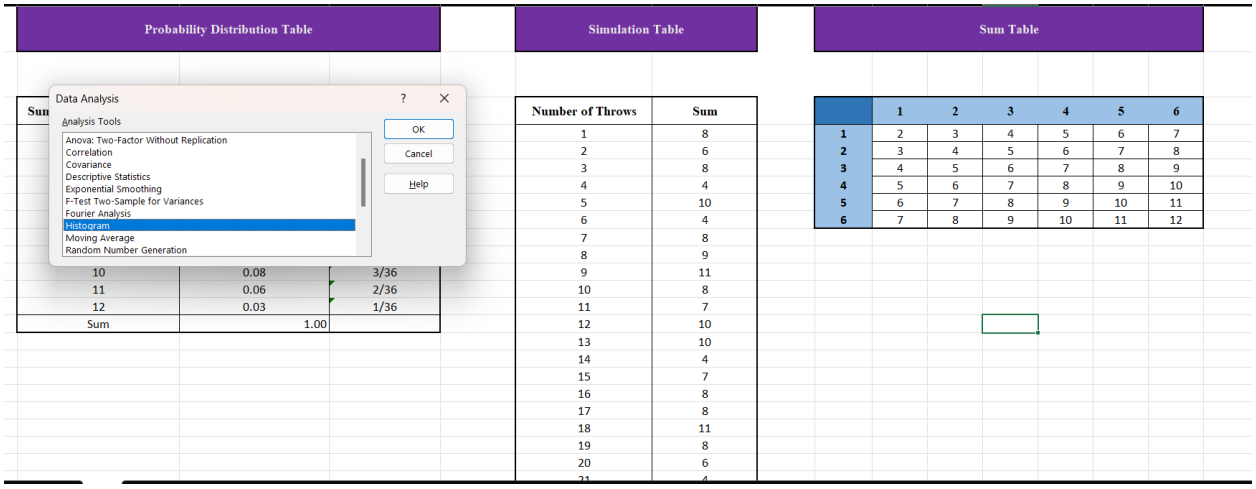
Number of Throws	Sum
1	8
2	6
3	8
4	4
5	10
6	4
7	8
8	9
9	11
10	8
11	7
12	10
13	10
14	4
15	7
16	8
17	8
18	11
19	8
20	6

Sum Table

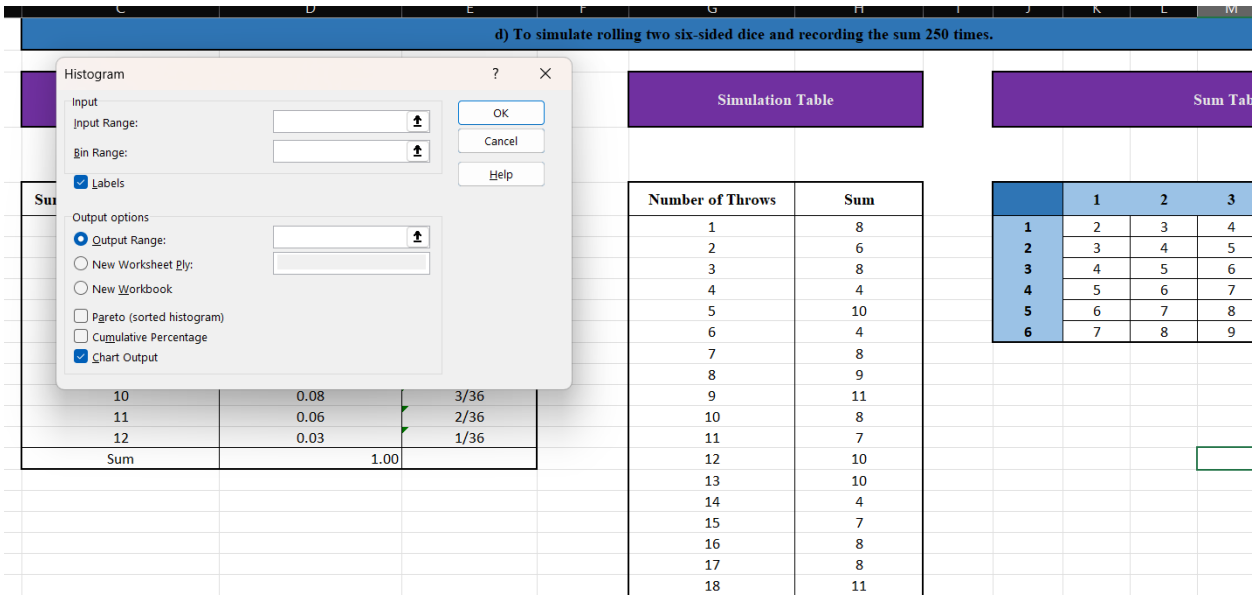
	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12

4) Creating a histogram

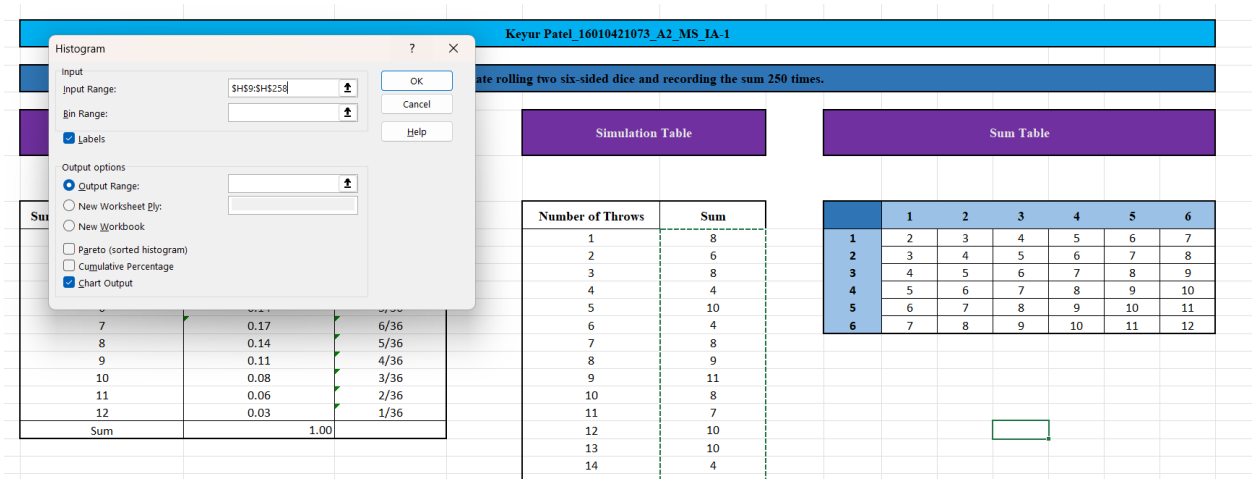
For creating histogram, we will again use “Data Analysis” tool pack in excel.



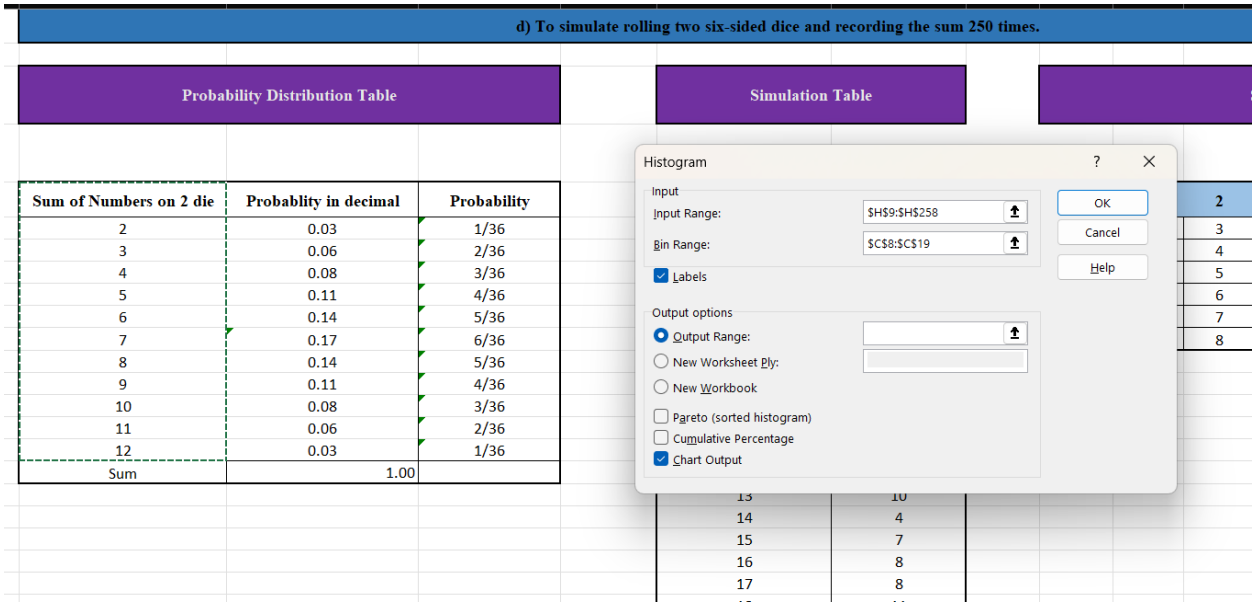
After clicking on “OK” –



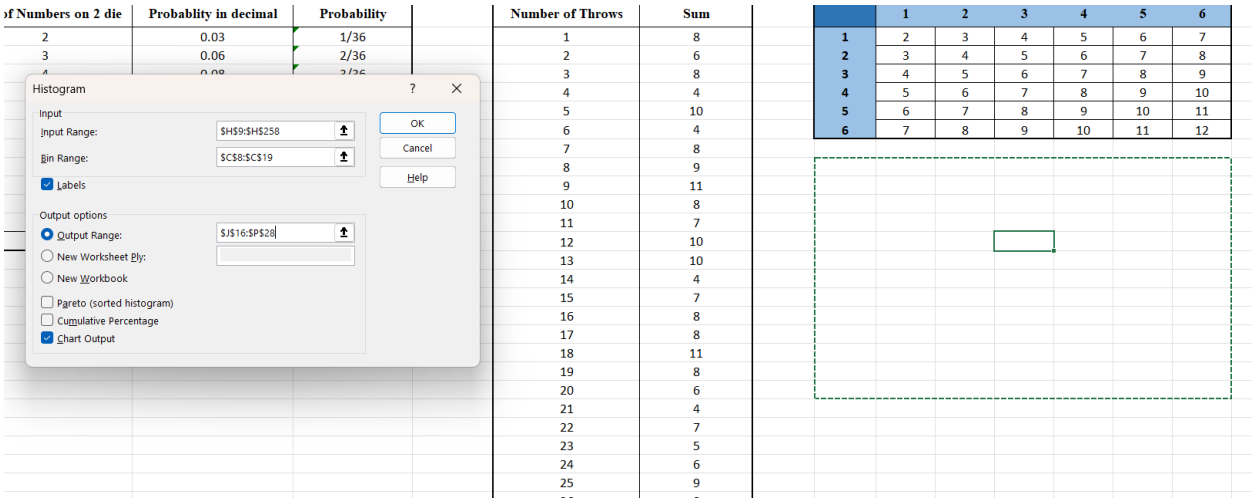
Selecting input range –



Selecting bin range –



Selecting output range –

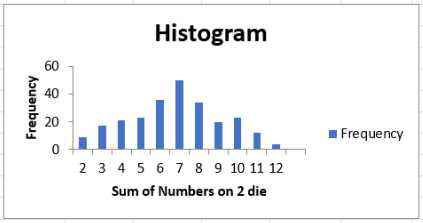


After clicking on “OK” –

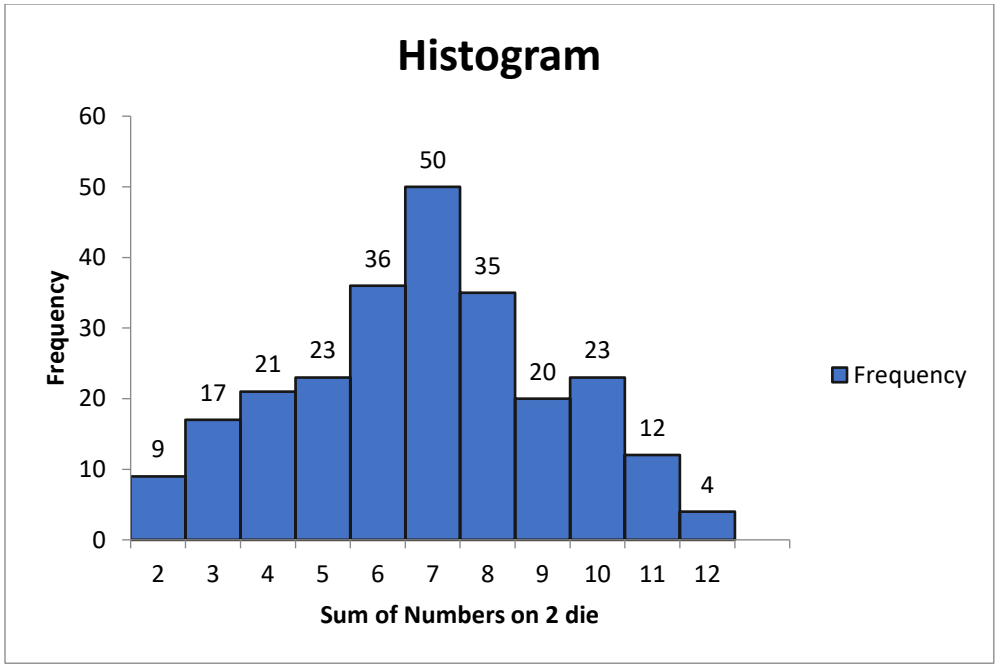
Number of Throws	Sum
1	8
2	6
3	8
4	4
5	10
6	4
7	8
8	9
9	11
10	8
11	7
12	10
13	10
14	4
15	7
16	8
17	8
18	11
19	8
20	6
21	4
22	7
23	5

	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12

Sum of Numbers on 2 die	*Frequency*
2	9
3	17
4	21
5	23
6	36
7	50
8	34
9	20
10	23
11	12
12	4



Final histogram –



5) Final

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d) To simulate rolling two six-sided dice and recording the sum 250 times.

Probability Distribution Table

Sum of Numbers on 2 die	Probablity in decimal	Probability
2	0.03	1/36
3	0.06	2/36
4	0.08	3/36
5	0.11	4/36
6	0.14	5/36
7	0.17	6/36
8	0.14	5/36
9	0.11	4/36
10	0.08	3/36
11	0.06	2/36
12	0.03	1/36
Sum	1.00	

Simulation Table

Number of Throws	Sum
1	8
2	6
3	8
4	4
5	10
6	4
7	8
8	9
9	11
10	8
11	7
12	10
13	10
14	4
15	7
16	8
17	8
18	11
19	8
20	6
21	4
22	7
23	5
24	6
25	9

Sum Table

	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12

Sum of Numbers on 2 die	*Frequency*
2	9
3	17
4	21
5	23
6	36
7	50
8	35
9	20
10	23
11	12
12	4
	250