

# Assignment 5-Probability and Random Variable

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Download latex code from here-

[https://github.com/annu100/AI5002-Probability-and-Random-variables/tree/main/ASSIGNMENT\\_5](https://github.com/annu100/AI5002-Probability-and-Random-variables/tree/main/ASSIGNMENT_5)

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[https://github.com/annu100/AI5002-Probability-and-Random-variables/blob/main/ASSIGNMENT\\_5/assignment\\_5.py](https://github.com/annu100/AI5002-Probability-and-Random-variables/blob/main/ASSIGNMENT_5/assignment_5.py)

(2,1)(2,2)(2,3)(2,4)(2,5)(2,6)

(3,1)(3,2)(3,3)(3,4)(3,5)(3,6)

(4,1)(4,2)(4,3)(4,4)(4,5)(4,6)

(5,1)(5,2)(5,3)(5,4)(5,5)(5,6)

(6,1)(6,2)(6,3)(6,4)(6,5)(6,6)]

$E_2 \rightarrow$  event of getting sum as 2  
No. of favorable outcomes =1 (i.e.,(1,1))

$$P(E_2) = \frac{1}{36}$$

$E_3 \rightarrow$  event of getting sum as 3

No. of favorable outcomes =2 (i.e.,(1,2)(2,1))

$P(E_3) = \frac{2}{36}$   
 $E_4 \rightarrow$  event of getting sum as 4

No. of favorable outcomes =3  
(i.e.,(3,1)(2,2)(1,3))

$P(E_4) = \frac{3}{36}$   
 $E_5 \rightarrow$  event of getting sum as 5

No. of favorable outcomes =4  
(i.e.,(1,4)(2,3)(3,2)(4,1))

$P(E_5) = \frac{4}{36}$   
 $E_6 \rightarrow$  event of getting sum as 6

No. of favorable outcomes =5(i.e.,(1,5)(2,4)(3,3)(4,2)(5,1))

$$P(E_6) = \frac{5}{36}$$

$E_7 \rightarrow$  event of getting sum as 7

## I. PROBLEM STATEMENT-PROBLEM 4.10

Two dice, one blue and one grey, are thrown at the same time.

1) Complete Table 4.1.1.

|    |                |
|----|----------------|
| 2  | $\frac{1}{36}$ |
| 3  | —              |
| 4  | —              |
| 5  | —              |
| 6  | —              |
| 7  | —              |
| 8  | $\frac{5}{36}$ |
| 9  | —              |
| 10 | —              |
| 11 | —              |
| 12 | $\frac{1}{36}$ |

2) A student argues that there are 11 possible outcomes 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12. Therefore, each of them has a probability  $\frac{1}{11}$ . Do you agree with this argument? Justify your answer.

## II. SOLUTIONS

Since we know ,the possible outcomes when a pair of two dices are thrown. Therefore,In a throw of pair of dice, blue and grey, total no of possible outcomes= $36(6 \times 6)$  which are [(1,1)(1,2)(1,3)(1,4)(1,5)(1,6)

Table I: Caption

No. of favorable outcomes =6  
(i.e.,(1,6)(2,5)(3,4)(4,3)(5,2)(6,1))

$P(E_7)=\frac{6}{36}$   
 $E_8 \rightarrow$  event of getting sum as 8

No. of favorable outcomes =5  
(i.e.,(2,6)(3,5)(4,4)(5,3)(6,2))

$P(E_8)=\frac{6}{36}$   
 $E_9 \rightarrow$  event of getting sum as 9

No. of favorable outcomes =4  
(i.e.,(3,6)(4,5)(5,4)(6,3))

$P(E_9)=\frac{4}{36}$   
 $E_{10} \rightarrow$  event of getting sum as 10

No. of favorable outcomes =3  
(i.e.,(4,6)(5,5)(6,4))  
 $P(E_{10})=\frac{3}{36}$

$E_{11} \rightarrow$  event of getting sum as 11

No. of favorable outcomes =2,(i.e.,(6,5)(5,6))  
 $P(E_{11})=\frac{2}{36}$

$E_{12} \rightarrow$  event of getting sum as 12

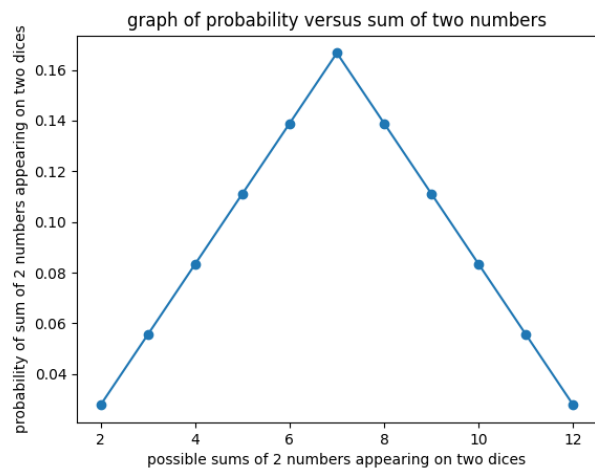
No. of favorable outcomes =1,(i.e.,(6,6))  
 $P(E_{12})=\frac{1}{36}$

From the figure(table) we can see that the outcomes are not equally likely - we see that, there is different probability for different outcome. Hence,not agreed with the argument completely. Complete Table 4.1.1.

|    |                |
|----|----------------|
| 2  | $\frac{1}{36}$ |
| 3  | $\frac{2}{36}$ |
| 4  | $\frac{3}{36}$ |
| 5  | $\frac{4}{36}$ |
| 6  | $\frac{5}{36}$ |
| 7  | $\frac{6}{36}$ |
| 8  | $\frac{5}{36}$ |
| 9  | $\frac{4}{36}$ |
| 10 | $\frac{3}{36}$ |
| 11 | $\frac{2}{36}$ |
| 12 | $\frac{1}{36}$ |

Table II: Sum of numbers on 2 dice and their probability

Figure 1: graph for probability of sum of 2 numbers on 2 dice



Above is is the graph of probability for getting sum of two numbers appearing on 2 dices versus possible sums