

ASSIGNMENT- 3

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Abstract

- This document contains the solution to Question of Chapter 6 (Probability) in the NCERT Class 11 Textbook.

Let $X=0,1,2$ be the random variables representing the following cases.

Two dice are thrown . The events A,B and C are as follows:

$X=0$: A-getting an even number on first dice

$X=1$: B-getting an odd number on first dice

$X=2$: C-getting sum of the number on the dice less than or equal to 5

Describe the events

1. A'
2. not B
3. A or B
4. A and B
5. A but not C
6. B or C
7. B and C
8. A and B' and C'

The sample space for throwing two dice is:-

$$S = \{\{1,1\}, \{1,2\}, \{1,3\}, \{1,4\}, \{1,5\}, \{1,6\}, \{2,1\}, \{2,2\}, \{2,3\}, \{2,4\}, \{2,5\}, \{2,6\}, \{3,1\}, \{3,2\}, \{3,3\}, \{3,4\}, \{3,5\}, \{3,6\}, \{4,1\}, \{4,2\}, \{4,3\}, \{4,4\}, \{4,5\}, \{4,6\}, \{5,1\}, \{5,2\}, \{5,3\}, \{5,4\}, \{5,5\}, \{5,6\}, \{6,1\}, \{6,2\}, \{6,3\}, \{6,4\}, \{6,5\}, \{6,6\}\}$$

The three events A, B and C are defined below:-

$$\{X=0\} = \{\{2,1\}, \{2,2\}, \{2,3\}, \{2,4\}, \{2,5\}, \{2,6\}, \{4,1\}, \{4,2\}, \{4,3\}, \{4,4\}, \{4,5\}, \{4,6\}\}$$

$$\{X=1\} = \{\{1,1\}, \{1,2\}, \{1,3\}, \{1,4\}, \{1,5\}, \{1,6\}, \{3,1\}, \{3,2\}, \{3,3\}, \{3,4\}, \{3,5\}, \{3,6\}\}$$

$$\{X=2\} = \{\{1,1\}, \{1,2\}, \{1,3\}, \{1,4\}, \{2,1\}, \{2,2\}, \{2,3\}, \{3,1\}, \{3,2\}, \{4,1\}\}$$

1. $\{X'=0\}$ -Getting an odd number on the first dice

$$\{X'=0\} = \{\{1,1\}, \{1,2\}, \{1,3\}, \{1,4\}, \{1,5\}, \{1,6\}, \{3,1\}, \{3,2\}, \{3,3\}, \{3,4\}, \{3,5\}\}$$

2. $\{X'=1\}$ - Getting an even number on the first dice

$$\{X'=1\} = \{\{2,1\}, \{2,2\}, \{2,3\}, \{2,4\}, \{2,5\}, \{2,6\}, \{4,1\}, \{4,2\}, \{4,3\}, \{4,4\}, \{4,5\}\}$$

3. $\{X=0+X=1\}$ -getting even number or getting an odd number on first dice.

$$\{X=0+X=1\} = \{\{1,1\}, \{1,2\}, \{1,3\}, \{1,4\}, \{1,5\}, \{1,6\}, \{2,1\}, \{2,2\}, \{2,3\}, \{2,4\}\}$$

4. $\{X=0\}\{X=1\}$ =Getting an odd and even number on first dice.

$$\{X=0\}\{X=1\} = \text{NULL}$$

5. $\{X=0\}\{X'=2\}$ - Getting an even number on the first dice and the sum is more than 5.

$$\{X=0\}\{X'=2\} = \{\{2,4\}, \{2,5\}, \{2,6\}, \{4,2\}, \{4,3\}, \{4,4\}, \{4,5\}, \{4,6\}, \{6,1\}, \{6,2\}\}$$

$$6. \{X=1+X=2\} = \{\{1,1\}, \{1,2\}, \{1,3\}, \{1,4\}, \{1,5\}, \{1,6\}, \{3,1\}, \{3,2\}, \{3,3\}, \{3,4\}\}$$

7. $\{X=1\}\{X=2\}$ - Getting an odd number on the first dice and sum is less than or equal to 5

$$\{X=1\}\{X=2\} = \{\{1,1\}, \{1,2\}, \{1,3\}, \{1,4\}, \{3,1\}, \{3,2\}, \{3,3\}\}$$

8. $\{X=1\}$ -Getting an even number on the first dice and sum on both dice is greater than 5.

$$\{X=0\}\{X'=1\}\{X'=2\} = \{\{2,4\}, \{2,5\}, \{2,6\}, \{4,2\}, \{4,3\}, \{4,4\}, \{4,6\}, \{6,1\}, \{6,2\}\}$$