

Assignment 1

AI1110: Probability and Random Variables
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22. Two dice are thrown at the same time and the product of numbers appearing on them is noted. Find the probability that the product is less than 9.

Answer: $\frac{4}{9}$.

Solution:

x = Outcome of the first dice

y = Outcome of the second dice

To solve this problem, write down the possibilities where the product of numbers appeared on the dice is less than 9.

The out come of each dice can be=[1,2,3,4,5,6]

The possible out comes of (x,y) =
[(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)]

There are total of $6 \times 6 = 36$ outcomes possible.

The possible out comes of (x,y) such that $x*y < 9$ =
[(1, 1), (1, 2), (1, 3), (1, 4), (1, 5), (1, 6), (2, 1), (2, 2), (2, 3),
(2, 4), (3, 1), (3, 2), (4, 1), (4, 2), (5, 1), (6, 1)]

The total number of possibilities where 2 dice are thrown such the product of the numbers on the dice is less than 9= 16

$$P(\text{product} < 9) = \frac{\text{number of outcomes where the product is less than 9}}{\text{total number of possible outcomes}} = \frac{16}{36}$$

Conclusion : The probability that the product is less than 9 = $\frac{4}{9}$