

AI1103-Assignment 1

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Download all python codes from

<https://github.com/Shambhu-K/Assignment-1/blob/main/assignment-1.py>

and latex-tikz codes from

<https://github.com/Shambhu-K/Assignment-1/blob/main/Assignment-1.tex>

$$P(X = 1) = \binom{6}{1} \times \left(\frac{1}{6}\right)^1 \times \left(\frac{5}{6}\right)^{6-1} \quad (0.0.4)$$

$$P(X = 2) = \binom{6}{2} \times \left(\frac{1}{6}\right)^2 \times \left(\frac{5}{6}\right)^{6-2} \quad (0.0.5)$$

$$P(X \leq 2) = \frac{5^6}{6^6} \times 1 + \frac{5^5}{6^6} \times 6 + \frac{5^4}{6^6} \times 15 \quad (0.0.6)$$

$$P(X \leq 2) = 0.937714 \quad (0.0.7)$$

PROBLEM

(4.6) Find the probability of throwing at most 2 sixes in 6 throws of a single die.

SOLUTION

Let X represent the number of sixes in six throws of a dice

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

By Binomial distribution formula,

$$P(X = k) = \binom{n}{k} p^k (1 - p)^{n-k} \quad (0.0.1)$$

Here,

Symbol	Meaning
k	no. of sixes in six throws of a dice
n	no. of throws i.e. 6
p	probability of getting a six in a single throw of dice = $\frac{1}{6}$

To find the probability of getting atmost two sixes in six throws of a single dice:

$$P(X \leq 2) = P(X = 0) + P(X = 1) + P(X = 2) \quad (0.0.2)$$

$$P(X = 0) = \binom{6}{0} \times \left(\frac{1}{6}\right)^0 \times \left(\frac{5}{6}\right)^{6-0} \quad (0.0.3)$$