Assignment 2

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Download all python codes from

https://github.com/AmulyaTallamraju/Assignment−3/blob/main/Assignment3/codes/Assignment−3.py

and latex-tikz codes from

https://github.com/AmulyaTallamraju/Assignment−3/blob/main/Assignment3/Assignment−3.tex

GATE 2016 (XE-A) - Q.9

Shaquille O' Neal is a 60% career free throw shooter, meaning that he successfully makes 60 free throws out of 100 attempts on average. What is the probability that he will successfully make exactly 6 free throws in 10 attempts?

A) 0.2508
B) 0.2816
C) 0.2934
D) 0.6000

SOLUTION

Let

$$X_i \in \{0, 1\} \tag{0.0.1}$$

represent the i^{th} free throw, where 1 represents a successful free throw attempt and 0 represents an unsuccessful attempt. Let

$$X = \sum_{i=1}^{n} X_i \tag{0.0.2}$$

where n is the total number of free throws. Then, X has a binomial distribution with

$$\Pr(X = k) = {}^{n}C_k \times p^k \times q^{n-k} \tag{0.0.3}$$

Where,

$$p = \frac{6}{10} \tag{0.0.4}$$

$$q = 1 - p = \frac{4}{10} \tag{0.0.5}$$

$$n = 10 \tag{0.0.6}$$

from the given information. Then,

$$\Pr(X = 6) = {}^{10}C_6 \left(\frac{6}{10}\right)^6 \left(\frac{4}{10}\right)^4 \tag{0.0.7}$$

On simplifying we get,

$$\Pr(X = 6) = 0.2508 \tag{0.0.8}$$

Therefore, the probability that he will successfully make exactly 6 free throws in 10 attempts is 0.2508 and hence option (A) is correct.

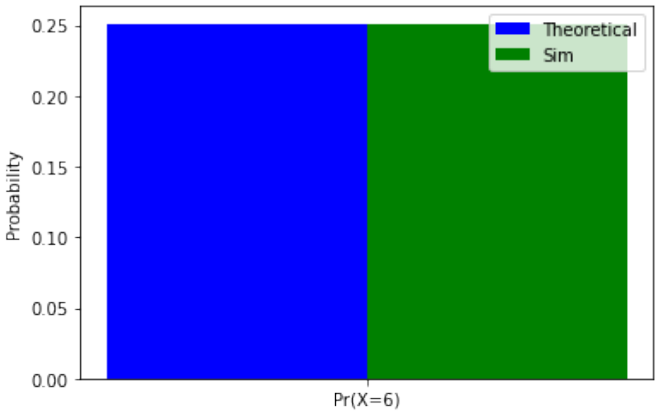

Fig. 4: Plot