

# Assignment 3

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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

$$X_i \in \{0, 1\} \quad (0.0.1)$$

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

$$X = \sum_{i=1}^n X_i \quad (0.0.2)$$

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

$$\Pr(X = k) = {}^nC_k p^k q^{n-k} \quad (0.0.3)$$

Where,

$$p = \frac{6}{10} \quad (0.0.4)$$

$$q = 1 - p = \frac{4}{10} \quad (0.0.5)$$

$$n = 10 \quad (0.0.6)$$

from the given information. Then,

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

On simplifying we get,

$$\Pr(X = 6) = 0.2508 \quad (0.0.8)$$

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

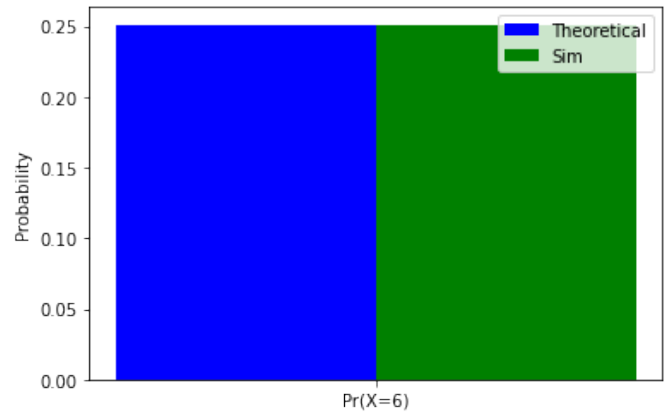


Fig. 4: Plot