**Answer on Question #83226 – Math – Statistics and Probability**

## Question

During a particular year, 70 percent of the common stocks listed on the Nigeria Stock Exchange increased in market value, while 30 percent were unchanged or declined in market value. At the beginning of the year a stock advisory service chose 10 stock issues as being "specially recommended." If the 10 issues represent a random selection, what is the probability that all 10 issues increased in market value?

a. 0.3342
b. 0.5147
c. 0.4481
d. 0.0282

## Solution

Let $x$ be the number of issues increased in market value.
Assume $X$ is a random variable that represents the number of issues increased in market value.
The total number of issues is $n = 10$.
The probability that the issue increased in market value is $p = 0.7$.
The distribution of $X$ follows binomial distribution with parameters

$$n = 10, p = 0.7.$$

The probability mass function for the binomial distribution is as follows:

$$p(x, n, p) = Pr(X = x) = \binom{n}{x} p^x (1-p)^{n-x}$$

The probability that all 10 issues increased in market value is

$$Pr(X = 10) = \binom{10}{10} 0.7^{10} (1-0.7)^{10-10} = 0.7^{10} \approx 0.0282$$

**Answer:** d. 0.0282