

Answer on question 38607 – Math – Statistic and Probability

Which of these statements is not true about the variance in a binomial distribution $B(n, p)$? _____

- A. For a fixed p , the variance increases as n increases.
- B. For a fixed n , the variance is maximum when $p = 0.5$.
- C. The variance depends only on n .
- D. The variance is constant for a specific n and p .
- E. None of these are true.

Solution.

A: The variance in a binomial distribution can be found by the formula

$$D(Y) = np(1 - p).$$

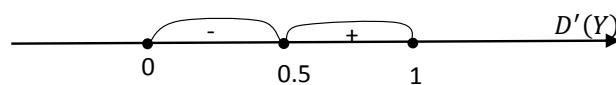
For a fixed p , the variance increases as n increases. A is true.

B: To find the maximum of variance we should find derivative of variance function with respect to p .

$$D(Y) = np - np^2$$

$$D'(Y) = n - 2np = n(1 - 2p) = 0$$

$$p = 0.5.$$



Therefore, for a fixed n , the variance is maximum when $p = 0.5$. B is true.

C. As we can see from our formula, the variance depends on n and p . C is not true.

D: If n and p are constants then the variance is constant. D is true.

Answer: C.