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## 6. Exercise: Variance of the uniform

Exercises due Feb 28, 2020 05:29 IST Completed

Exercise: Variance of the uniform

2.0/2.0 points (graded)

Suppose that the random variable X takes values in the set  $\{0,2,4,6,\ldots,2n\}$  (the even integers between 0 and 2n, inclusive), with each value having the same probability. What is the variance of X? Hint: Consider the random variable Y=X/2 and recall that the variance of a uniform random variable on the set  $\{0,1,\ldots,n\}$  is equal to n (n+2) /12.

Express your answer in terms of n using <u>standard notation</u>. Remember to write '\*' for all multiplications and to include parentheses where necessary.

## **STANDARD NOTATION**

## **Solution:**

Following the hint, let Y=X/2. The random variable Y takes values in the set  $\{0,1,2,\ldots,n\}$ , each value having the same probability. Therefore, Y is uniform and has a variance of n (n+2)/12. Since X=2Y,

$$\mathsf{Var}\left(X
ight) = \mathsf{Var}\left(2Y
ight) = 4 \cdot \mathsf{Var}\left(Y
ight) = rac{4}{12} n \left(n+2
ight).$$

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You have used 2 of 3 attempts

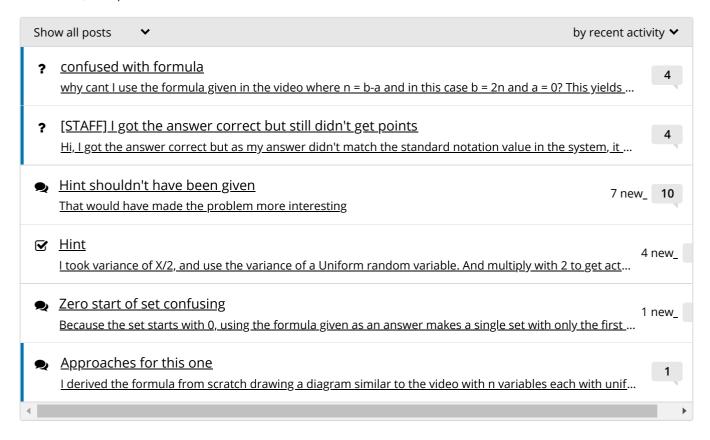


**1** Answers are displayed within the problem

## Discussion

**Hide Discussion** 

**Topic:** Unit 4: Discrete random variables:Lec. 6: Variance; Conditioning on an event; Multiple r.v.'s / 6. Exercise: Variance of the uniform



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