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21. Exercise: Linearity of expectations

Exercises due Feb 28, 2020 05:29 IST Completed

Exercise: Linearity of expectations

3.0/3.0 points (graded)

The random variable X is known to satisfy $\mathbf{E}[X]=2$ and $\mathbf{E}[X^2]=7$. Find the expected value of 8-X and of (X-3)(X+3).

a)
$$\mathbf{E}\left[8-X
ight]=egin{bmatrix}\mathsf{6}\end{aligned}$$
 Answer: 6

b)
$$\mathbf{E}\left[\left(X-3
ight)\left(X+3
ight)
ight]=$$
 -2 $ightharpoonup$ Answer: -2

Solution:

- a) The random variable 8-X is of the form aX+b, with a=-1 and b=8. By linearity, ${\bf E}\left[8-X\right]=-{\bf E}\left[X\right]+8=-2+8=6.$
- b) The random variable $(X-3)\,(X+3)$ is equal to X^2-9 and therefore its expected value is ${\bf E}\,[X^2]-9=7-9=-2$.

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You have used 2 of 3 attempts

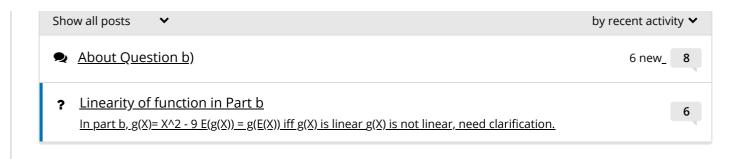
1 Answers are displayed within the problem

Discussion

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Topic: Unit 4: Discrete random variables:Lec. 5: Probability mass functions and expectations / 21. Exercise: Linearity of expectations





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