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Unit overview

Lec. 5: Probability mass functions and expectations
Exercises 5 due Mar 02, 2016 at 23:59 UT

Lec. 6: Variance; Conditioning on an event; Multiple r.v.'s
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Lec. 7: Conditioning on a random variable; Independence of r.v.'s

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Bookmark

Exercise: Linearity of expectations

(3/3 points)

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) $\mathbf{E}[8 - X] =$ 6 ✔ **Answer:** 6

b) $\mathbf{E}[(X-3)(X+3)] =$ -2 ✔ **Answer:** -2

Answer:
a) The random variable $8 - X$ is of the form $aX + b$, with $a = -1$ and $b = 8$. By linearity, $\mathbf{E}[8 - X] = -\mathbf{E}[X] + 8 = -2 + 8 = 6$.

b) The random variable $(X-3)(X+3)$ is equal to $X^2 - 9$ and therefore its expected value is $\mathbf{E}[X^2] - 9 = 7 - 9 = -2$.

You have used 1 of 2 submissions

Exercises 7 due Mar 02, 2016 at 23:59 UTC

Solved problems

Additional theoretical material

Problem Set 4
Problem Set 4 due Mar 02, 2016 at 23:59 UTC

Unit summary

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