



<u>Course</u> > <u>Unit 4:</u> ... > <u>Lec. 6:</u> ... > 15. Exe...

15. Exercise: Expected value rule

Exercises due Feb 28, 2020 05:29 IST Completed

Exercise: Expected value rule

4/6 points (graded)

Let X and Y be discrete random variables. For each one of the formulas below, state whether it is true or false.

a)
$$\mathbf{E}\left[X^{2}
ight]=\sum_{x}xp_{X}\left(x^{2}
ight)$$

b)
$$\mathbf{E}\left[X^{2}
ight]=\sum_{x}x^{2}p_{X}\left(x
ight)$$

c)
$$\mathbf{E}\left[X^{2}
ight]=\sum_{x}x^{2}p_{X,Y}\left(x
ight)$$

d)
$$\mathbf{E}\left[X^{2}
ight]=\sum_{x}x^{2}p_{X,Y}\left(x,y
ight)$$

e)
$$\mathbf{E}\left[X^{2}
ight]=\sum_{x}\sum_{y}x^{2}p_{X,Y}\left(x,y
ight)$$

f)
$$\mathbf{E}\left[X^{2}
ight]=\sum_{z}zp_{X^{2}}\left(z
ight)$$



Solution:

- a) False. This does not follow from any of our formulas.
- b) True. This is the expected value rule for a function of a single random variable.
- c) False. This is syntactically wrong since the function $p_{X,Y}$ needs two arguments.
- d) False. The left-hand side is a number whereas the right-hand side is actually a function of \boldsymbol{y}
- e) True. This is the expected value rule

$$\mathbf{E}\left[g\left(X,Y
ight)
ight] = \sum_{x} \sum_{y} g\left(x,y
ight) p_{X,Y}\left(x,y
ight),$$

for the function $g(x,y) = x^2$.

f) True. This is just the definition of the expectation $\mathbf{E}\left[Z\right]=\sum_{z}zp_{Z}\left(z\right)$, where Z is the random variable X^{2} .

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You have used 1 of 1 attempt

• Answers are displayed within the problem

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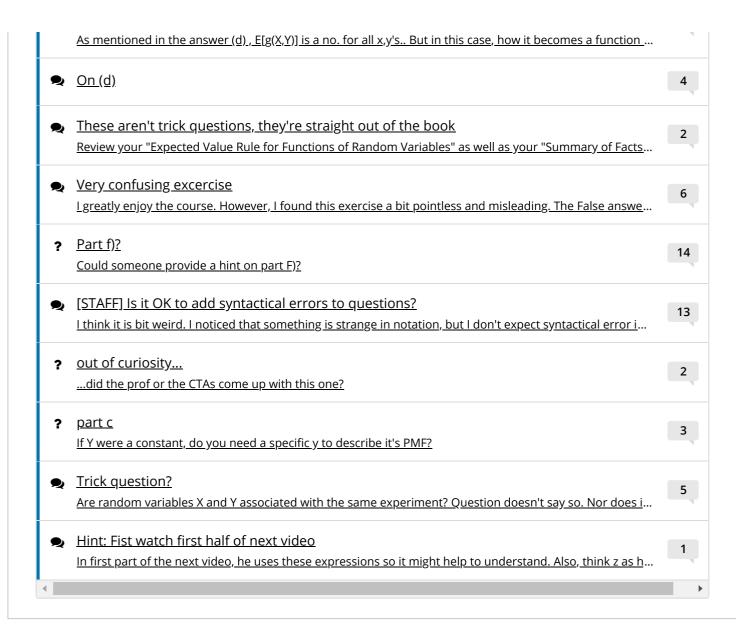
part f) is confusing
Z in part f) is just given without context. Of course I can define it as the way the answer shows but what i...

new_

(e)
Kindly explain the function g(x,y)=x^2. f(x)=x^2 is understood, where y varies as x^2 for all values of x - it...

3

? (<u>d)</u>



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