CASELLA AND BERGER NOTES AND EXERCISES - CHAPTER 4

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Exercises

Using this problem set: http://www.stat.ufl.edu/ jhobert/sta6326

Chapter 4: 1, 2, 4, 9, 10, 11, 15, 19(a), 22, 23, 24, 26, 27

Chapter 4: 30, 31, 33, 35, 39, 41, 45, 47, 51, 53, 55, 64

(4.1)

Straight forward.

(4.2)

These all follow directly from properties of the integral.

(4.4)

Integrating over a rectangle but the density is a the perimeter. Kind of odd, but pretty straight forward.

(4.9)

Couple ways to do this, but pretty straight forward.

(4.10)

Straight forward.

(4.11)

Read the problem wrong. If you read it right, it is fairly obvious.

(4.15)

REDO I really made a mess of this one.

(4.19)

REDO I missed the easy way to do this.

(4.22)

A direct application of change of variable.s

(4.23)

Skipping because I am lazy.

(4.24)

REDO first part is MGF, but not sure how to do the second part.

(4.26)

REDO didn't really understand how to do this one.

(4.27)

REDO got lost in the algebra.

(4.30)

I struggle with part (b) for some reason.

(4.31)

I messed up part (c), but all of these are straight forward.

(4.33)

TODO

(4.35)

Direct application of the conditioning variance formula.

(4.39)

REDO This is a really hard problem. I need to study more combinatorics to really tackle this.

(4.41)

Since covariance is an inner product,

$$\begin{aligned}
Cov(X, a) &= \langle X - \mu, a - \mu \rangle \\
&= \langle X, a - \mu \rangle - \langle \mu, a - \mu \rangle \\
&= \overline{\langle a - \mu, X \rangle} - \overline{\langle a - \mu, \mu \rangle} \\
&= \langle X, a \rangle - \langle X, \mu \rangle - \langle \mu, a \rangle + \langle \mu, \mu \rangle \\
&= \mu a - \mu^2 - \mu a + \mu^2 \\
&= 0.
\end{aligned}$$

(4.45)

Ugh, I skipped this because it was so long.

(4.47)

REDO typical counter example is tricky tricky.

(4.51)

Yeah, my answers have issues at 0. I am not sure how to remedy this.

(4.53)

REDO really cool problem. I totally messed it up.

(4.55)

Pretty straight forward actually.

(4.64)

(a), (b) follow from Schwartz inequality and the linearity of integration.

Notes

8 / 24

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8 / 25
