



MITx: 6.041x Introduction to Probability - The Science of Uncertainty



Bookmarks

- ▶ Unit 0:
Overview
- ▶ Entrance
Survey
- ▶ Unit 1:
Probability
models and
axioms
- ▶ Unit 2:
Conditioning
and
independence
- ▶ Unit 3:
Counting
- ▶ Unit 4: Discrete
random
variables
- ▼ Unit 5:
Continuous
random
variables

Unit overview

Lec. 8: Probability density functions

Exercises 8 due Mar 16, 2016 at 23:59 UTC

Lec. 9: Conditioning on an event; Multiple r.v.'s

Exercises 9 due Mar 16, 2016 at 23:59 UTC

Unit 5: Continuous random variables > Lec. 8: Probability density functions > Lec 8 Probability density functions vertical2



Bookmark

Exercise: Uniform PDF

(3/3 points)

Let X be uniform on the interval $[1, 3]$. Suppose that $1 < a < b < 3$. Then,

(a) $\mathbf{P}(a \leq X \leq b) =$ ✓ Answer: (b-a)/2

(Your answer to part (a) should be an algebraic expression involving a and b .)

(b) $\mathbf{E}[X] =$ ✓ Answer: 2

(c) $\mathbf{E}[X^3] =$ ✓ Answer: 10

Answer:

(a) The value of the PDF on the interval $[1, 3]$ must be equal to $1/2$, so that it integrates to 1. Thus, $\mathbf{P}(a \leq X \leq b) = \int_a^b \frac{1}{2} dx = \frac{b-a}{2}$.

(b) The expected value of a uniform is the midpoint of its range: $\mathbf{E}[X] = (1 + 3)/2 = 2$.

(c) Using the expected value rule,

$$\mathbf{E}[X^3] = \int_1^3 x^3 \cdot \frac{1}{2} dx = \frac{1}{2} \cdot \frac{1}{4} x^4 \Big|_1^3 = \frac{1}{2} \cdot \frac{1}{4} \cdot (81 - 1) = 10.$$

You have used 1 of 2 submissions

Lec. 10:
Conditioning on a
random variable;
Independence;
Bayes' rule

Exercises 10 due Mar
16, 2016 at 23:59 UTC

Standard normal
table

Solved problems

Problem Set 5

Problem Set 5 due Mar
16, 2016 at 23:59 UTC

Unit summary

© All Rights Reserved



© edX Inc. All rights reserved except where noted. EdX, Open edX and the edX and Open EdX logos are registered trademarks or trademarks of edX Inc.

POWERED BY
OPENedX

