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Unit overview

Lec. 11: Derived distributions

Exercises 11 due Mar 30, 2016 at 23:59 UTC

Unit 6: Further topics on random variables > Problem Set 6 > Problem 1 Vertical: The PDF of  $\exp(X)$ 

Bookmark

## Problem 1: The PDF of $\exp(X)$

(6/6 points)

Let  $\mathbf{X}$  be a random variable with PDF  $f_X$ . Find the PDF of the random variable  $\mathbf{Y} = e^X$  for each of the following cases:

1. For general  $f_X$ , when  $y > 0$ ,  $f_Y(y) =$

☐  $f_X\left(\frac{e^y}{y}\right)$

☐  $f_X\left(\frac{\ln y}{y}\right)$

☒  $\frac{f_X(\ln y)}{y}$  ✓

☐ none of the above

2. When  $f_X(x) = \begin{cases} 1/3, & \text{if } -2 < x \leq 1, \\ 0, & \text{otherwise,} \end{cases}$

we have  $f_Y(y) = \begin{cases} g(y), & \text{if } a < y \leq b, \\ 0, & \text{otherwise.} \end{cases}$

Give a formula for  $g(y)$  and the values of  $a$  and  $b$  using standard notation. (In your answers, you may use the symbol 'e' to denote the base of the natural logarithm.)

$g(y) =$   ✓

$a =$   ✓

$b =$   ✓

**Lec. 12: Sums of independent r.v.'s; Covariance and correlation**

Exercises 12 due Mar 30, 2016 at 23:59 UTC

**Lec. 13: Conditional expectation and variance revisited; Sum of a random number of independent r.v.'s**

Exercises 13 due Mar 30, 2016 at 23:59 UTC

**Solved problems**

**Additional theoretical material**

**Problem Set 6**

Problem Set 6 due Mar 30, 2016 at 23:59 UTC

**Unit summary**

3. When  $f_X(x) = \begin{cases} 2e^{-2x}, & \text{if } x > 0, \\ 0, & \text{otherwise,} \end{cases}$

we have  $f_Y(y) = \begin{cases} g(y), & \text{if } a < y, \\ 0, & \text{otherwise.} \end{cases}$

Give a formula for  $g(y)$  and the value of  $a$  using the standard notation .

$g(y) =$   ✓

$a =$   ✓

4. When  $X$  is a standard normal random variable, we have, for  $y > 0$ ,  $f_Y(y) =$

☐  $\frac{1}{\sqrt{2\pi}} e^{-\frac{(\ln y)^2}{2}}$

☒  $\frac{1}{\sqrt{2\pi}} \frac{e^{-\frac{(\ln y)^2}{2}}}{y}$  ✓

☐  $\frac{1}{\sqrt{2\pi}} e^{-\frac{(\ln y)^2}{2y}}$

☐  $\frac{1}{\sqrt{2\pi}} \frac{e^{-\frac{\ln y}{2}}}{y}$

☐ none of the above

*You have used 2 of 2 submissions*

Printable problem set available here .

**DISCUSSION**

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