

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



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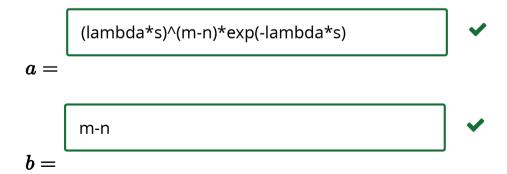
## Problem 5: Arrivals during overlapping time intervals

(8/8 points)

Consider a Poisson process with rate  $\lambda$ . Let N be the number of arrivals in (0,t] and M be the number of arrivals in (0,t+s], where  $t>0,s\geq 0$ .

In each part below, your answers will be algebraic expressions in terms of  $\lambda,t,s,m$  and/or n. Enter 'lambda' for  $\lambda$  and use 'exp()' for exponentials. Do **not** use 'fac()' or '!' for factorials. Follow standard notation .

1. For  $0 \le n \le m$ , the conditional PMF  $p_{M|N}(m \mid n)$  of M given N is of the form  $\frac{a}{b!}$  for suitable algebraic expressions in place of a and b.



- Unit 6: Further topics on random variables
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Unit overview

Lec. 21: The Bernoulli process

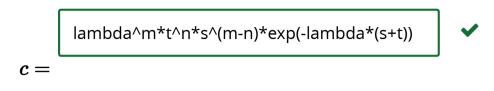
Exercises 21 due May 11, 2016 at 23:59 UTC

Lec. 22: The Poisson process

Exercises 22 due May 11, 2016 at 23:59 UTC

Lec. 23: More on the Poisson process

2. For  $0 \le n \le m$ , the joint PMF  $p_{N,M}(n,m)$  of N and M is of the form  $\frac{c}{n!d!}$  for suitable algebraic expressions in place of c and d.



d= m-n

<sup>3.</sup> For  $0 \le n \le m$ , the conditional PMF  $p_{N|M}(n|m)$  of N given M is of the form  $f \cdot \frac{g!}{n!h!}$  for suitable algebraic expressions in place of f, g, and h.



g=iggl[m]

h=

4.

Exercises 23 due May 11, 2016 at 23:59 UTC

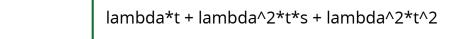
Solved problems

Additional theoretical material

## **Problem Set 9**

Problem Set 9 due May 11, 2016 at 23:59 UTC

**Unit summary** 



$$E[NM] =$$

You have used 2 of 3 submissions

## DISCUSSION

Click "Show Discussion" below to see discussions on this problem.

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