



4. Exercise: People in the park

Exercises due May 13, 2020 05:29 IST Completed

Exercise: People in the park

2/2 points (graded)

Busy people arrive at the park according to a Poisson process with rate $\lambda_1 = 3$ /hour and stay in the park for exactly $1/6$ of an hour. Relaxed people arrive at the park according to a Poisson process with rate $\lambda_2 = 2$ /hour and stay in the park for exactly half an hour. The arrivals of busy and relaxed people are independent processes. An observer visits the park at a specific time and sees B busy and R relaxed people at the park at that moment.

For both parts below, use standard notation. If your answer involves the exponential function, use notation such as $e^{(3)}$.

a) Find that probability that $B = 0$. *Hint:* Think about what must have happened in the immediate past. Recall also the formula for the Poisson PMF with parameter λ :

$$\frac{\lambda^k e^{-\lambda}}{k!}, \quad \text{for } k = 0, 1, 2, \dots$$

$\mathbf{P}(B = 0) =$ ✓ Answer: $e^{(-0.5)}$

b) Find the probability that $B + R = 1$.

$\mathbf{P}(B + R = 1) =$ ✓ Answer: $1.5 * e^{(-1.5)}$

[STANDARD NOTATION](#)**Solution:**

a) The busy people that the observer sees are exactly those busy people who arrived during the last $(1/6)$ th of an hour. It is therefore a Poisson random variable with parameter $3 \cdot (1/6) = 1/2$. The desired probability is $e^{-1/2}$.

b) By the same argument, R is an independent Poisson random variable with parameter $2 \cdot (1/2) = 1$. Thus, $B + R$ is a Poisson random variable with parameter 1.5. Using the formula for the Poisson PMF,

$$\mathbf{P}(B + R = 1) = 1.5e^{-1.5}.$$

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You have used 3 of 3 attempts

i Answers are displayed within the problem








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-  [STAFF] Technical issue 4 new_
I'm entering a formula of a product of a fraction and an exponent function. Everything fine in a preview f...
-  [STAFF] Silly mistake: I wrote a comma instead of decimal point. Please correct my score. 2
Please, check my answer to the second question. You'll see it's correct, I just wrote a comma instead of a...
-  Hint for (a) and (b) 1
Might be a bit late but I hope it is helpful. The observer can only see the busy people who come into the ...
-  Law of total probability 2
I thought about solving b) using the law of total probability and got to the correct answer.
-  What would be tau and lamdba in the second case? 6
-  Hint for both questions- (a) and (b) 1 new_
For both a and b, we need lambda and k values; one of them are given in the questions; we just need to ...
-  Formula for ans.
Use the formula in the last video which has lambda* tao



? Process start time question?

Is it valid to assume that both the processes start at the same time?

2

💬 a) The probability of no busy person being in the park already.

7

💬 [STAFF] I entered right answer but it marks wrong answer (Please correct this)

I entered the answer right but missed the last bracket that closes everything. Please can you correct the ...

2

? Probability of $R=0$ and $R=1$

For R , using the value given in the question plugged into the formula, I calculate the probability of $R = 0$ a...

2

? Isn't merging 2 poisson processes the same as summing them?

Isn't merging 2 poisson processes the same as summing them? If so, why is the new merged (added) pro...

3

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