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Courses » Probability and Statistics

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Unit 6 - Week 4

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Course outline

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Assignment 4

The due date for submitting this assignment has passed. As per our records you have not submitted this assignment.

Due on 2019-02-27, 23:59 IST

1 point

1) Let X follow a zero truncated Poisson distribution with the probability mass function given by

$$P(X = x) = \frac{1}{1 - e^{-\lambda}} \frac{e^{-\lambda} \lambda^x}{x!}, \quad x = 1, 2, 3, \dots$$

Then $E\left(\frac{1}{1+X}\right)$ is

- a. $\frac{1}{\lambda}$.
- b. $\frac{1}{\lambda(e^\lambda - 1)} \{e^\lambda - \lambda - 1\}$.
- c. $\frac{1}{\lambda(e^\lambda - 1)} \{e^\lambda + \lambda - 1\}$.
- d. $\frac{1}{\lambda(e^\lambda - 1)} \{e^\lambda + \lambda + 1\}$.

- a
- b
- c
- d

No, the answer is incorrect.

Score: 0

Accepted Answers:

b

1 point

2) In a super computer system, CPU cooling is controlled by electronically driven fans. Assume that the lifetime T (in weeks) of a fan can be modelled by an exponential distribution with $\lambda = 0.002$. The probability that a fan will be working event after 1000 weeks is

- a. e^{-1}
- b. $e^{-3/2}$
- c. e^{-2}

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Week 12

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Assignment
Solution

- c
 d

No, the answer is incorrect.**Score: 0****Accepted Answers:**

c

3)

1 point

Four percent pens produced by a company are defective. Pens are packed in boxes of 61 containing 150 pens. The company gives the guarantee that at most 2 pens in a box will be defective. Using the Poisson approximation to the binomial, the probability that a box will fail to meet the guarantee is

- a. $1 - 7e^{-6}$
b. $1 - 25e^{-6}$
c. $1 - 61e^{-6}$
d. $61e^{-6}$

- a
 b
 c
 d

No, the answer is incorrect.**Score: 0****Accepted Answers:**

b

4)

1 point

Let X be a Poisson random variable with parameter λ and $P(X=0) + 2P(X=2) = 2P(X=1)$

Then $P(X > 2)$ is equal to

- a. $1 - \frac{3}{2}e^{-1}$
b. $1 - \frac{5}{2}e^{-1}$
c. $\frac{5}{2}e^{-1}$
d. $\frac{3}{2}e^{-1}$

- a
 b
 c
 d

No, the answer is incorrect.**Score: 0****Accepted Answers:**

b

5)

1 point

A series system has three independent components. The life time X_i of the i^{th} component is exponentially distributed with parameter $\lambda_i = \frac{1}{i}$, $i = 1, 2, 3$. If the system has failed before time t , the probability that the failure was caused by only second component is

a. $e^{\frac{t}{2}} \left(1 - e^{-\frac{t}{2}} \right)$

b. $\frac{e^{-\frac{4t}{3}} \left(1 - e^{-\frac{t}{2}} \right)}{\left(1 + e^{-\frac{11t}{6}} \right)}$

c. $\frac{e^{-\frac{4t}{3}} \left(1 - e^{-\frac{t}{2}} \right)}{\left(1 - e^{-\frac{11t}{6}} \right)}$

d. $e^{\frac{t}{2}} \left(1 + e^{-\frac{t}{2}} \right)$

- a
 b
 c
 d

No, the answer is incorrect.

Score: 0

Accepted Answers:

c

6)

1 point

A small shopping mall has five air-conditioner (AC's). The lifetimes of an AC's follow independent and identical exponential distributions with mean 100 hours. If all AC's are used simultaneously, then the probability that after 100 hours there are at least two AC's in work condition is given by

a. $\frac{(e+4)(e-1)^4}{e^5}$

b. $\frac{(e-6)(e-1)^4}{e^5}$

c. $1 - \frac{(e-6)(e-1)^4}{e^5}$

d. $1 - \frac{(e+4)(e-1)^4}{e^5}$

- a
 b
 c
 d

No, the answer is incorrect.

Score: 0

Accepted Answers:

d

7)

1 point

A water tank supplier distributes 10 liters of drinking water per house per day. The consumption per house follows gamma distribution with mean 10 and variance 50. The probability that the supply is insufficient on a given day is

- a. $\frac{3}{2}e^{-2}$
- b. $2e^{-2}$
- c. $3e^{-2}$
- d. $4e^{-2}$

- a
- b
- c
- d

No, the answer is incorrect.

Score: 0

Accepted Answers:

c

8)

1 point

Under a certain complicated birth situation, the mortality rate of a new born child is given by $Z(t) = 0.5 + 2t$, $t > 0$. If the baby survives to age one, the probability that he/she will survive to age 2 is

- a. 0.03
- b. 0.11
- c. 0.23
- d. 0.87

- a
- b
- c
- d

No, the answer is incorrect.

Score: 0

Accepted Answers:

a

9)

1 point

The lifetime X (in months) of a bulb is modelled as a Weibull distribution with $\beta = 3$. It is observed that the conditional probability that a component will be working after 3 months given that it is working after 2 months is $e^{-19/2}$. The probability that the component is working after 4 months is

- a. e^{-1}
- b. e^{-2}
- c. e^{-3}
- d. e^{-4}

- a
- b
- c

d

No, the answer is incorrect.
Score: 0

Accepted Answers:
d

10) 1 point

A random variable X has a beta distribution with mean $\frac{2}{3}$ and the variance is $\frac{1}{18}$. Then $P(0.2 < X < 0.5)$ is equal to

a. 0.15
b. 0.21
c. 0.30
d. 0.42

a
 b
 c
 d

No, the answer is incorrect.
Score: 0

Accepted Answers:
b

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