Submit

1

0 points possible (ungraded)

Assume a telemarketer's successful sales per hour is a Poisson random variable with $\lambda = 2$. What is the probability that the telemarketer makes no sales in 1 hour?

- ⦿ 13.5% ✔
- ◯ 22.5%
- ◯ 27.7%
- ◯ 31.2%

Answer
Correct: Video: Poisson Distribution

Explanation
$P\left(X = k\right) = \frac{\lambda^k}{k!}e^{-\lambda}$. With $\lambda = 2$, $P\left(X = 0\right) = e^{-2} = 0.135$

Submit   You have used 1 of 2 attempts

🛈 Answers are displayed within the problem

2

0 points possible (ungraded)

The expectation of a Poisson random variable and its variance are

- ⦿ equal ✔
- ◯ not equal

Submit   You have used 1 of 1 attempt

3

2.0/2.0 points (graded)

Random variable X is distributed Poisson, and $P(X = 2) = P(X = 4)$. Find $P(X = 3)$.

| 0.216865 |

✔ **Answer:** 0.2169

| 0.216865 |

Explanation

$P(X = 2) = P(X = 4)$ implies $\lambda = 2\sqrt{3}$. Hence $P(X = 3) = 4\sqrt{3} \cdot e^{-2\sqrt{3}}$.

| Submit | You have used 1 of 4 attempts

ⓘ Answers are displayed within the problem

4

0 points possible (ungraded)

Let X be distributed Poisson with parameter 1. Find $P(X \geq 2 \mid X \leq 4)$.

| 21 |

✘ **Answer:** 17/65

| 21 |

Explanation

Here $P(X = i) = e^{-1}/i!$. Therefore

$$P(X \geq 2 \mid X \leq 4) = \frac{P(X \geq 2 \cap X \leq 4)}{P(X \leq 4)} = \frac{(1/2 + 1/6 + 1/24)e^{-1}}{(1 + 1 + 1/2 + 1/6 + 1/24)e^{-1}}$$ and the answer follows.

| Submit | You have used 4 of 4 attempts

ⓘ Answers are displayed within the problem

5

0 points possible (ungraded)

Assume the number of typo errors on a single page of a book follows Poisson distribution with parameter 1/3. Calculate the probability that on one page there are

- no typo,

011

✖ **Answer:** 0.7165313

011

Explanation

Recall that for a random variable $X \sim Poisson\,(\lambda)$ its distribution is given by $P\,(X = i) = e^{-\lambda} \cdot \frac{\lambda^i}{i!}$, for $i > 0$ $\lambda = 1/3$ here. Thus probability of no typo errors is $P\,(X = 0) = e^{-\lambda} = e^{-1/3} = 0.7165313$

- exactly two typos,

✖ **Answer:** 0.039807295

Explanation

Similarly the probability of exactly two typo errors is $P\,(X = 2) = e^{-\lambda} \frac{\lambda^2}{2!} = e^{-1/3} \frac{(1/3)^2}{2!} = 0.039807295$

- more than one typo?

✖ **Answer:** 0.0446249

Explanation

Consider the compliment or the probabilty of at most one typo. This probability is given by $P\,(X = 0) + P\,(X = 1) = e^{-\lambda} + e^{-\lambda}\frac{\lambda}{1!} = e^{-1/3} + e^{-1/3}\frac{(1/3)}{1!}$ Thus our required probabilty is $1 - (e^{-1/3} + e^{-1/3}\frac{(1/3)}{1!}) = 0.0446249$.

Submit   You have used 4 of 4 attempts

ⓘ   Answers are displayed within the problem

6

0 points possible (ungraded)

If a random variable X follows Poisson distribution with $\lambda = 2.5$, calculate

- $E[X]$

| 2.5 | | ✔ |

2.5

- $E[X^2]$

| 8.75 | | ✔ |

8.75

- $V(X)$

| 2.5 | | ✔ |

2.5

| Submit | You have used 2 of 4 attempts |

✔ Correct

7

0 points possible (ungraded)

Assume the number of tropical storms making landfall in the Philippines each year follows Poisson distribution with parameter 9. What is the probability that there are less than 6 tropical storms making landfall in Philippines in one year?

| 3 | ✘ **Answer:** 0.1157 |

3

Explanation

Follows from summing the corresponding Poisson probabilities under $\lambda = 9$.

Submit   You have used 3 of 3 attempts

ℹ️   Answers are displayed within the problem

8

3/3 points (graded)

A computer manufacturing company produce chips with defect probability 0.001. In a package of 2000 chips, denote the number of defective chips by X. Use Poisson distribution for approximation:

- The Poisson parameter for X is:

2   ✔

2

- $P(X > 1) =?$

0.5944   ✔

0.5944

- $P(X \leq 3) =?$

0.855   ✔

0.855

Submit   You have used 2 of 4 attempts

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💬 **Problem 3**