Stats
Video

- Hello, and welcome back.

So far, we talked about probability

where everything was designed by us.

Like, we said, okay, this is a uniform distribution,

it behaves exactly in that way.

Or this is a geometric distribution or binomial.

Everything was very clean and very precise

and behaved exactly the way we wanted it.

And now, we're going to

11.1_Statistics

POLL

Recall a statistic is a single value calculated from the sample. Which of the following is a statistic?

RESULTS

all of the above	**97%**
sample max	**2%**
sample mean	**1%**
sample median	**0%**

Submit

Results gathered from 171 respondents.

FEEDBACK

All of them are statistics.

1

3.0/3.0 points (graded)

225 iPhones go on sale on black friday, and 100 customers are in line to buy them. If the random number of iPhones that each customer wishes to buy is distributed Poisson with mean 2, approximate the probability that all 100 customers get their desired number of iPhones?

0.9623 ✔ **Answer:** 0.9615

0.9623

Explanation

The total iPhone demand may be expressed as a sum $S = X_1 + \ldots + X_{100}$, where each X_i is distributed Poission(2), denoting the number of iPhones demanded by the ith custorer. By the central limit theorem, $S = X_1 + \ldots + X_{100}$ is distributed approximately $\mathcal{N}(200, 200)$. Therefore we may approximate the probability as

$$P(S \leq 225) = P\left(\frac{S-200}{\sqrt{200}} \leq \frac{25}{\sqrt{200}}\right) \approx \Phi\left(\frac{25}{\sqrt{200}}\right) = 0.9615$$

Submit You have used 2 of 4 attempts

Answers are displayed within the problem

2

3.0/3.0 points (graded)

The number of years a Bulldog lives is a random variable with mean 9 and standard deviation 3, while for Chihuahuas, the mean is 15 and the standard deviation is 4. Approximate the probability the that in a kennel of 100 Bulldogs and 100 Chihuahuas, the average Chihuahua lives at least 7 years longer than the average Bulldog.

The checker accepts answers with tolerance 0.001

0.0228 ✔ **Answer:** 0.0228

0.0228

Explanation

Let $B_i, C_i, i \in \{1, \ldots, 100\}$denote the number of years the ith Bulldog, Chihuahua lives respectively. Then, by the central limit theorem, the difference in average lifetime, $D = \sum_{i=1}^{100} \frac{C_i - B_i}{100}$ is distributed $\mathcal{N}\left(6, 25/100\right)$. Therefore

$$P\left(D \geq 7\right) = P\left(\frac{D-6}{\sqrt{25/100}} \geq \frac{1}{\sqrt{25/100}}\right) \approx 1 - \Phi\left(\sqrt{100/25}\right) = 1 - \Phi\left(2\right) = 0.0228$$

Submit You have used 1 of 4 attempts

Answers are displayed within the problem

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