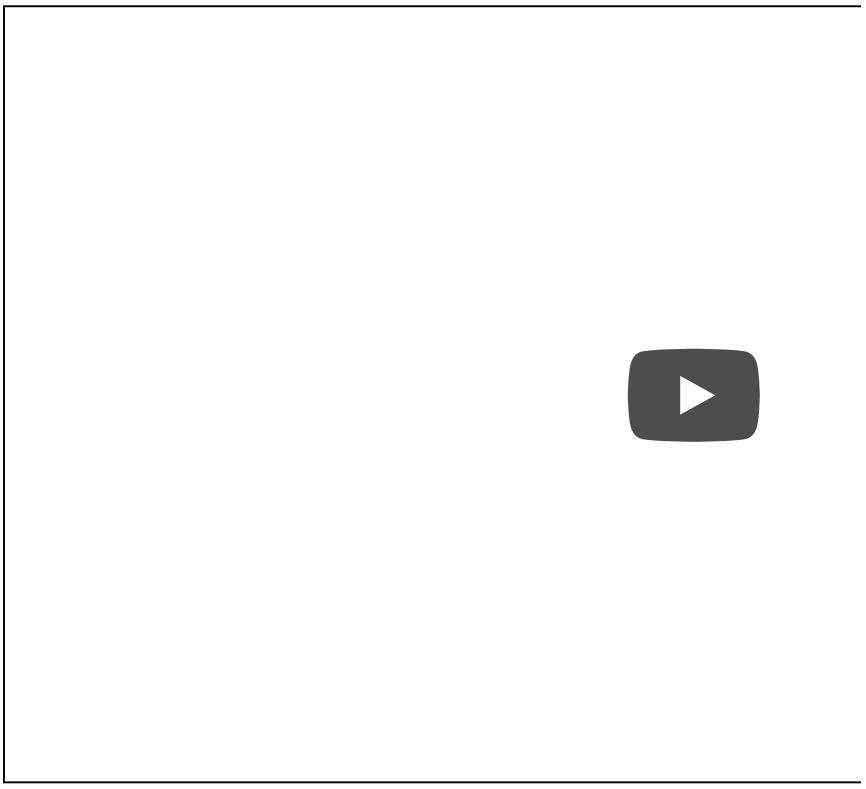
CLT
Video



Start of transcript. Skip to the end.

- Hello and welcome back.

Now that we have talked about several bounds on probability,

we're ready to talk about one of the most important results

in probability and statistics, the central limit theorem.

So just a little bit of an overview.

The central limit theorem,

10.6_Central_Limit_Theorem

POLL

Let X be a random variable with μ = 10 and σ = 4. If X is sampled 100 times, what is the approximate probability that the sample mean of these 100 observations is less than 9?

RESULTS

0.006	**57%**
None of the above	**16%**
0.002	**15%**
0.004	**12%**

Submit

Results gathered from 111 respondents.

FEEDBACK
The answer is 0.006.

1

0.0/2.0 points (graded)
For $i \geq 1$, let $X_i \sim G_{1/2}$ be distributed Geometrically with parameter $1/2$.

Define

$$Y_n = \frac{1}{\sqrt{n}} \sum_{i=1}^{n} (X_i - 2)$$

Approximate $P\left(-1 \leq Y_n \leq 2\right)$ with large enough n.

? **Hint (1 of 1):** Note that Y_n is not "properly" normalized. Next Hint

Submit You have used 0 of 4 attempts

2

3.0/3.0 points (graded)

A class has 100 students. Each student's score is a random variable with mean 85 and standard deviation 40. Use the CLT to approximate the proability that the class average score is below 80.

0.10149 ✔ **Answer:** 0.1056

0.10149

Explanation

The class average score $\frac{1}{100}\sum_{i=1}^{100} X_i$ has mean 85 and standard deviation $\frac{40}{\sqrt{100}} = 4$.

The probability can be calculated using $\Phi\left(\frac{80-85}{4}\right) = \Phi\left(-1.25\right) = 0.1056$

Submit You have used 2 of 3 attempts

Answers are displayed within the problem

Discussion

Topic: Topic 10 / Central Limit Theorem

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