Point Estimate

-Inferring from samples

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INTERNSHIPSTUDIO

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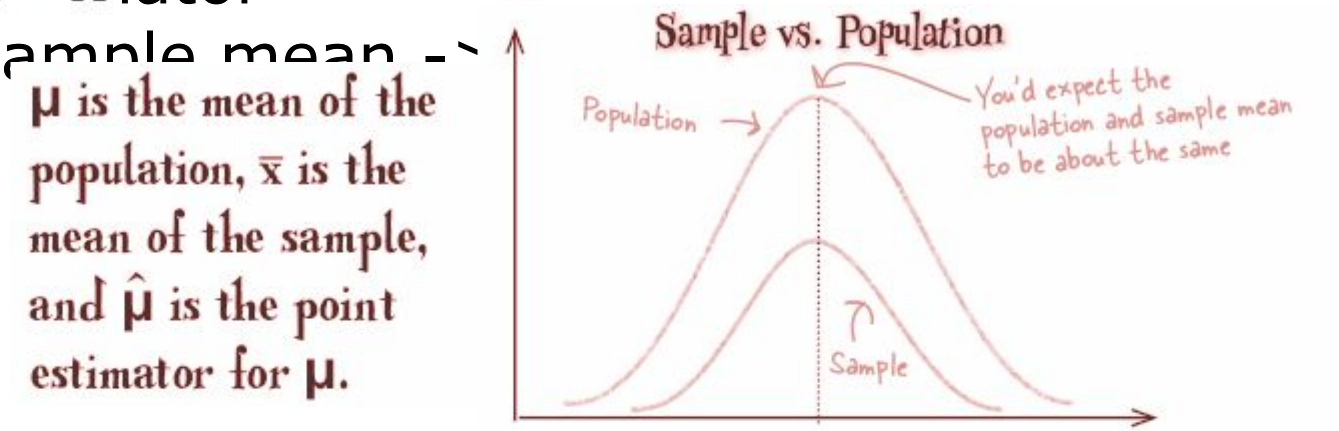
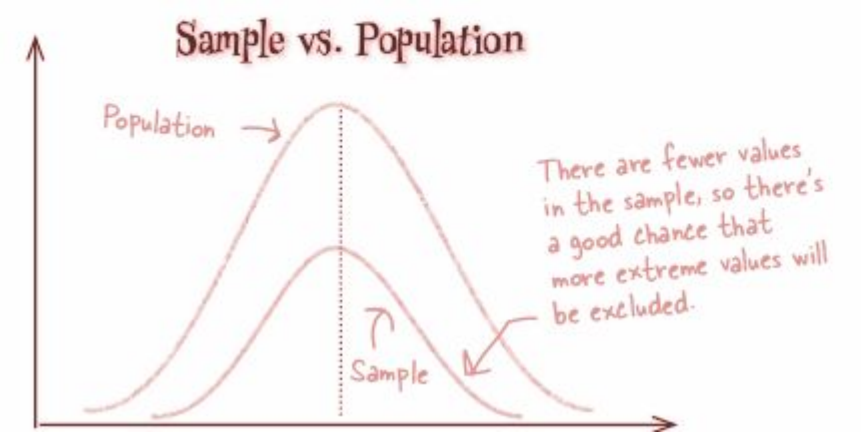


Population Variance



$$\hat{\sigma}^2 = \frac{\Sigma(x - \bar{x})^2}{n - 1}$$

Proportion/Probability

- The point estimator for p is given by p_s ,where p_s is the proportion of successes in the sample.

$$\hat{p} = p_s \qquad p_s = \frac{\text{number of successes}}{\text{number in sample}}$$

Finding the probability

Q)The mean number of gems per packet is 10, and the variance is 1. If you take a sample of 30 packets, what's the probability that the sample mean is 8.5 gems per packet or fewer?

Sampling distribution of the mean

- Look at all possible samples the same size as the one we're considering
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- Look at the distribution formed by all the samples, and find the expectation and variance for the sample mean
- Once we know how the sample mean is distributed, we can use it to find probabilities

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$$\text{If } X \sim N(\mu, \sigma^2), \text{ then } \overline{X} \sim N(\mu, \sigma^2/n)$$

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Finding the corresponding z value -> $z = (8.5 - 10)/\sqrt{0.0333} = -8.22$

$P(Z<z)= P(Z< -8.22)$

This probability is too small to appear on probability tables!

CLT Simulation

https://www.youtube.com/watch?v=aIPvgiXyBMI