1. Consider two sets of samples drawn from the same population that are randomly selected. Set X has a sample size = 10, and set Y has a sample size = 100. Which of the following statements is accurate about the confidence interval for the mean of the samples? 1 / 1 point

- (●) The confidence interval for set X is **larger** than the confidence interval for set Y.
- ( ) The confidence interval for set X is **smaller** than the confidence interval for set Y.
- ( ) The confidence interval for set X **equals** the confidence interval for set Y.
- ( ) There isn't enough information to answer the question.

✓ Correct
Confidence interval estimates the range within a population parameter, in this case, the population mean. Since set X has a smaller sample size, the sample distribution gets further away from the normal distribution, and the standard deviation is larger. With a larger standard deviation, this results in a larger confidence interval.

2. Suppose you have a sample of 100 heights of individuals from a specific population. Assume the **population standard deviation** is 1 cm, and the **sample mean** is 175cm from a **random sample** of 100 individuals. What expression describes the margin of error for a confidence level of 99%? 1 / 1 point

- ( ) $z_{0.01} \cdot \frac{1}{10}$
- ( ) $z_{0.005} \cdot \frac{1}{100}$
- (●) $z_{0.005} \cdot \frac{1}{10}$
- ( ) $z_{0.1} \cdot \frac{1}{100}$

✓ Correct
Since the question asks for a confidence level of 99% $\alpha/2 = \frac{0.01}{2} = 0.005$. The formula for the margin of error is $z_{\alpha/2} \cdot \frac{\sigma}{\sqrt{n}}$.

3. To calculate a confidence interval for the **mean** of a population, what assumptions must be made? **Select all that apply.** 1 / 1 point

- [x] The sample is a random sample.

✓ Correct
A random sample is crucial for a reliable confidence interval for the population mean as it ensures representativeness. Random sampling provides an equal chance for each population member to be included, reducing bias and enhancing

- [ ] The population must follow a normal distribution.
- [x] The sample size must be big enough (usually over 30).

✓ Correct

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Correct
The Central Limit Theorem says the average sample mean **converges to** a normal distribution. It means that the bigger the sample, the closer it is to a normal, so we must ensure that there are enough points for this approximation to be good enough.

- [ ] The sample must have a mean = 0 and a standard deviation = 1.

4. You have a sample size of 20 from a population with unknown mean and standard deviation. You measured that the **sample mean** $\overline{X} = 50$ and the **sample standard deviation is** $s = 10$. A confidence interval of 95% of confidence level is given by: 1 / 1 point

Hint: $t_{0.475} = 2.093$

- ○ $(48.95, 51.05)$
- ◉ $(45.32, 54.68)$
- ○ $(45.2, 54.8)$
- ○ $(48.9, 51.1)$

Correct

5. A manufacturing company takes a sample of 100 items in its product warehouse and determines that 22% of the sample contains a defect. Calculate the **population margin of error** with a 95% confidence interval. 1 / 1 point

Hint: $z_{\alpha/2} = 1.96$

- ○ 0.0336
- ◉ 0.0812
- ○ 0.0919
- ○ 0.3363

Correct
When calculating the confidence interval for proportions, the formula is

$$\text{margin of error} = z_{\alpha/2} \cdot \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$$