

AP Statistics · Sampling Distributions · Quiz

Common Core AP Statistics Unit 2 (2026-27) · mathovore.fr

Name: _____ Date: ____/____/____ Score: _____

This ap statistics sampling distributions quiz asks 10 multiple-choice questions on sampling distributions, and each answer comes with a short explanation.

Ten multiple-choice questions check the central ideas of sampling distributions: the mean and standard deviation of a sample proportion and a sample mean, the effect of sample size, the Central Limit Theorem, bias and variability, and differences. Each question has one correct answer; read the explanation after you choose.

AP StatisticsCommon Core: AP Statistics Unit 2 (2026-27)

Questions

Question 1

A random sample of 80 students is taken from a school where 30% play sports. What is the mean of the sampling distribution of the sample proportion?

- A. 0.30
- B. 0.30 divided by 80
- C. 24
- D. 0.0512

Question 2

For $p = 0.2$ and $n = 100$, what is the standard deviation of the sample proportion?

- A. 0.4
- B. 0.04
- C. 0.0016
- D. 0.16

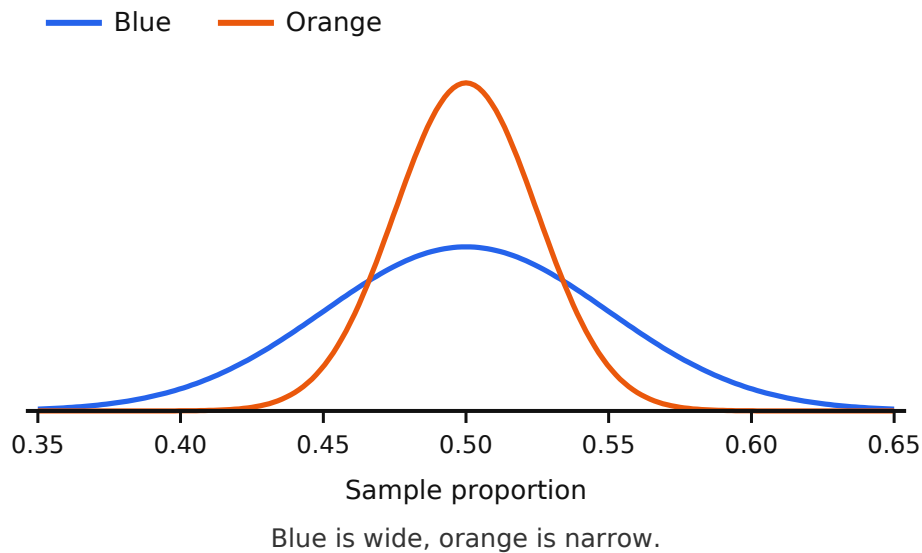
Question 3

A sample size is multiplied by 4. What happens to the standard deviation of the sample mean?

- A. It is divided by 4
- B. It is multiplied by 2
- C. It stays the same
- D. It is divided by 2

Question 4

The curves show sampling distributions of a sample proportion from the same population for $n = 100$ and $n = 400$. Which statement is correct?



- A. The narrow curve is $n = 100$ because smaller samples vary less
- B. The narrow curve is $n = 400$ because larger samples vary less
- C. The wide curve is $n = 400$ because larger samples vary more
- D. The curves differ in center because the sample sizes differ

Question 5

When is the sampling distribution of the sample mean approximately normal for a strongly skewed population?

- A. When $n = 10$
- B. When $n = 5$
- C. When $n = 50$
- D. Never, because the population is skewed

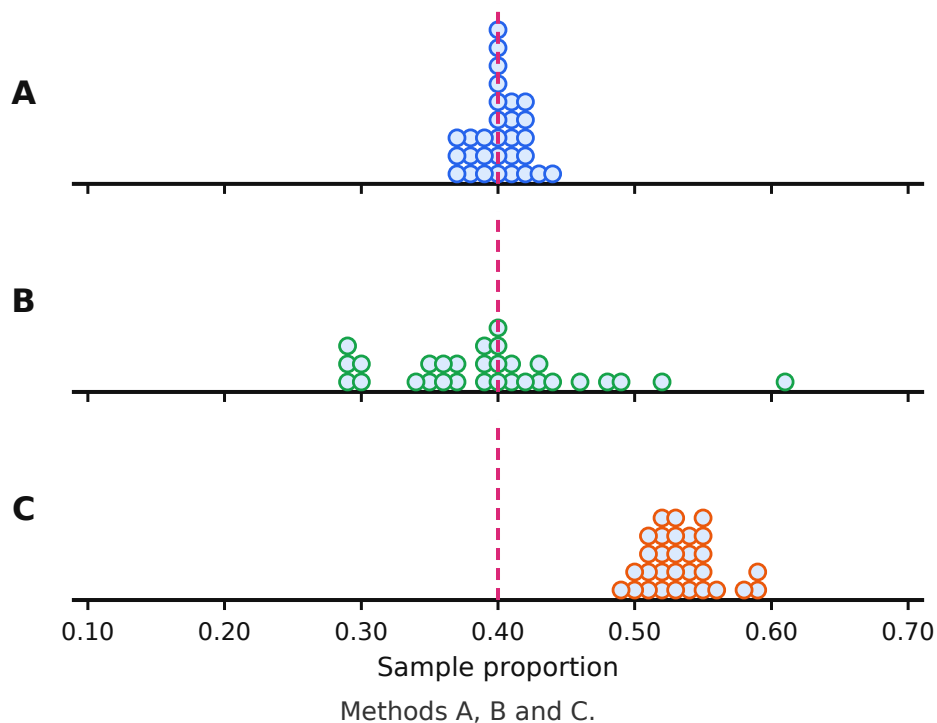
Question 6

A population has standard deviation 15. What is the standard deviation of the sample mean for $n = 25$?

- A. 0.6
- B. 15
- C. 3
- D. 75

Question 7

The dot plots show sample proportions from three methods for estimating $p = 0.40$ (dashed line). Which method has low bias and low variability?



- A. Method B
- B. Method C
- C. All three methods
- D. Method A

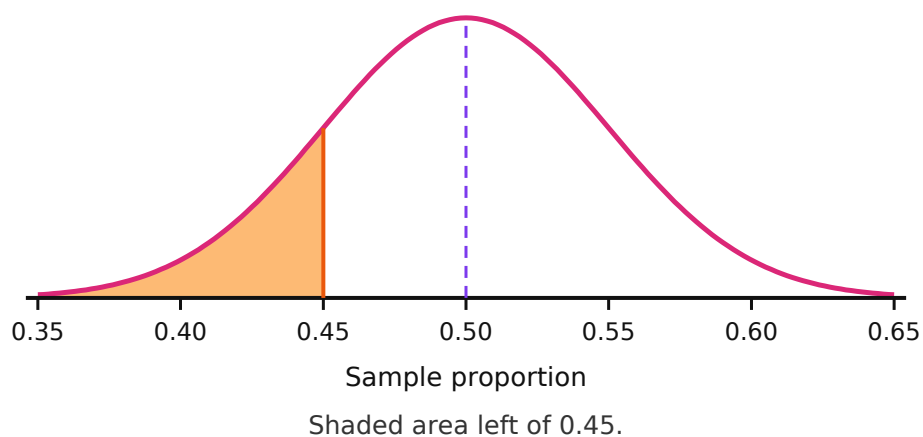
Question 8

Sample 1: $\sigma = 6$, $n = 36$. Sample 2: $\sigma = 8$, $n = 64$. What is the standard deviation of the difference of sample means?

- A. 1.41
- B. 2.00
- C. 0.29
- D. 1.00

Question 9

The sampling distribution of a sample proportion is approximately normal with mean 0.50 and standard deviation 0.05. What is the shaded area, $P(\hat{p} < 0.45)$?



- A. 0.8413
- B. 0.3174
- C. 0.1587
- D. 0.0500

Question 10

Two independent samples have $p_1 = 0.70$ and $p_2 = 0.55$. What is the mean of the sampling distribution of the difference of sample proportions?

- A. 0.15
- B. 1.25
- C. 0.385
- D. 0.0225

Answer key

1. **A** – The mean of the sampling distribution of $\hat{p}$ always equals the population proportion $p = 0.30$. The value 24 is the expected count, and 0.0512 is the standard deviation.
2. **B** – The standard deviation is the square root of $0.2(0.8)/100 = 0.0016$, so 0.04. The value 0.0016 is the variance and 0.16 is $p(1-p)$.
3. **D** – The standard deviation is sigma over the square root of n , so multiplying n by 4 divides it by the square root of 4, which is 2.
4. **B** – A larger sample gives a smaller standard deviation, hence the narrower curve. The center is p for both.
5. **C** – The Central Limit Theorem gives approximate normality for large n , with n of at least 30 as a rule of thumb. A skewed population makes small samples non-normal, not every sample.
6. **C** – The standard deviation is 15 divided by the square root of 25, so 3. Dividing by n instead gives 0.6.
7. **D** – A is centered at 0.40 with little spread. B is unbiased but highly variable, and C has little spread but is centered above 0.40.
8. **A** – Variances add: $36/36 + 64/64 = 2$, and the square root is 1.41. The value 2.00 forgets the square root.
9. **C** – The value 0.45 is one standard deviation below the mean, so the area to the left is 0.1587. The value 0.3174 counts both tails.
10. **A** – The mean of $\hat{p}_1$ minus $\hat{p}_2$ is $p_1 - p_2 = 0.15$. Adding gives 1.25 and multiplying gives 0.385.

How does this quiz work?

Read each question, choose one answer among A, B, C and D, then check it: a short explanation appears after every answer. Your score out of 10 is shown at the end, and you can restart the quiz as often as you like.

What should you review before the quiz?

Reread the key facts of the lesson and the worked example. If a question is hard, go back to the matching part of the lesson, then try the quiz again. Write your work on scrap paper: most mistakes come from skipping a step, not from the idea itself.

Remember:

- Sample proportion: $\mu_{\hat{p}} = p$, $\sigma_{\hat{p}} = \sqrt{\frac{p(1-p)}{n}}$; normal when $np \geq 10$ and $n(1-p) \geq 10$.
- Sample mean: $\mu_{\bar{x}} = \mu$, $\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$; approximately normal if the population is normal or $n \geq 30$ (Central Limit Theorem).

- The standard-deviation formulas need independence: $n \leq 10\%$ of the population when sampling without replacement.
- Random sampling gives unbiased statistics; a larger n reduces variability, and quadrupling n halves the standard deviation.
- For differences, the means subtract but the variances add.

How to use this ap statistics sampling distributions quiz

Retake this ap statistics sampling distributions quiz until every answer is right, then move on to the worksheet and the test.

