

AP Statistics · Sampling Distributions · Worksheet

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

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This ap statistics sampling distributions worksheet gives 23 problems on sampling distributions, ordered from easy to hard, with a separate answer key.

These problems practice the sampling distributions of Unit 2 in AP Statistics (2026-27): the sampling distribution of a sample proportion and of a sample mean, the Central Limit Theorem, bias and variability, and the distributions of differences of two sample proportions or two sample means.

Check the conditions before each calculation, name the model you use, and state conclusions in context. Round probabilities to four decimal places.

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

AP Statistics Sampling Distributions Worksheet: problems 1-5

Problem 1: Mean and SD of a sample proportion

Sixty percent of the voters in a county favor a school bond. A random sample of 100 voters is taken. Find the mean and standard deviation of the sampling distribution of $\hat{p}$.

Problem 2: Is it approximately normal?

Decide whether the sampling distribution of $\hat{p}$ is approximately normal. (a) $p=0.05$, $n=100$. (b) $p=0.3$, $n=60$.

Problem 3: Probability for a sample proportion

In a large city, 30% of residents use public transit weekly. A random sample of 200 residents is surveyed. Find the probability that more than 35% of the sample use public transit weekly.

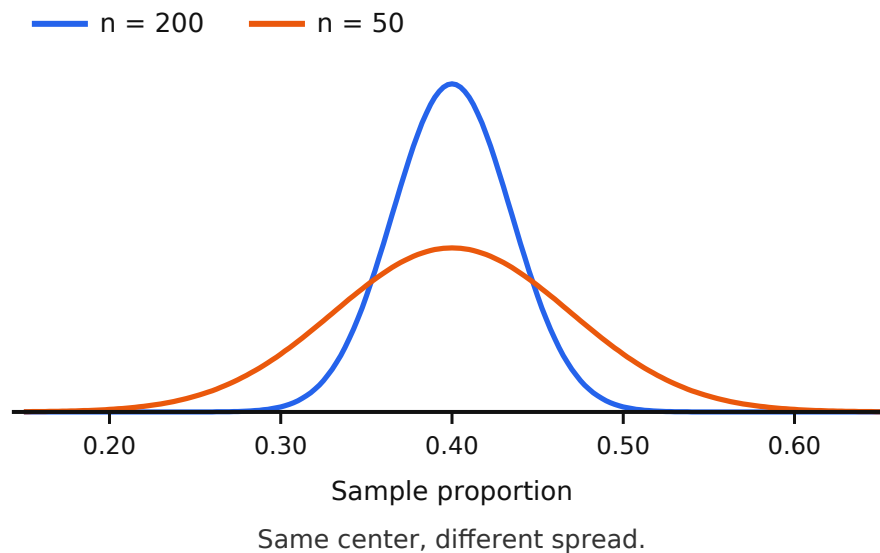
Problem 4: The 10% condition

A school has 250 students. Mei surveys a random sample of 40 of them. May she use $\sqrt{\frac{p(1-p)}{n}}$ for the standard deviation of $\hat{p}$? What if the school had 2,500 students?

Problem 5: Effect of sample size

Samples are drawn from a population with $p=0.4$. The curves show the sampling distributions of $\hat{p}$ for $n=50$ and $n=200$. Find both standard deviations and describe how the sample size

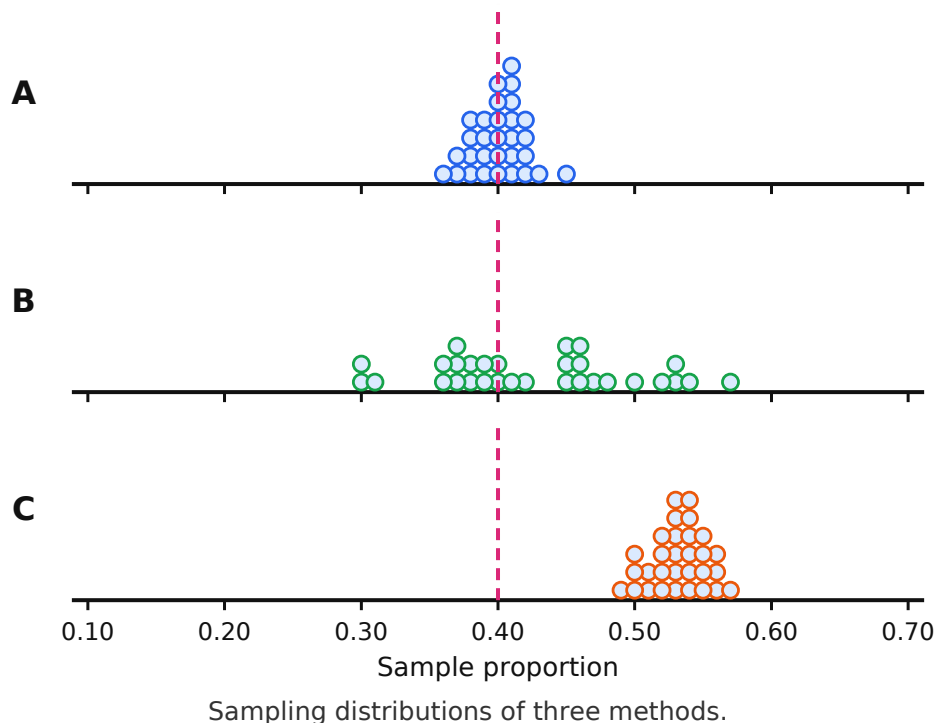
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AP Statistics Sampling Distributions Worksheet: problems 6-10

Problem 6: Bias and variability

Three methods estimate a true proportion $p = 0.40$. Dot plots A, B and C show 30 sample proportions from each method; the dashed line marks p . Describe the bias and variability of each method and say which method is best.



Problem 7: Mean and SD of a sample mean

Adult cats in a shelter have a mean weight of 68 ounces with a standard deviation of 12

ounces. A random sample of 36 cats is weighed. Find the mean and standard deviation of $\bar{x}$.

Problem 8: Normal population

The weight of a student backpack is normal with mean 14.2 pounds and standard deviation 3 pounds. (a) Find the standard deviation of the mean weight $\bar{x}$ of 9 randomly chosen backpacks. (b) Find $P(\bar{x} > 15.5)$. (c) Find the probability that one backpack weighs more than 15.5 pounds and compare.

Problem 9: Central Limit Theorem

Checkout times at a grocery store are strongly right-skewed with mean 4.2 minutes and standard deviation 3.6 minutes. For a random sample of 40 customers, find the probability that the mean checkout time is less than 3.5 minutes. Justify using a normal model.

Problem 10: Small sample, skewed population

A population of home prices is strongly right-skewed. Explain why a normal model for $\bar{x}$ is not justified when $n=8$, and what could be done.

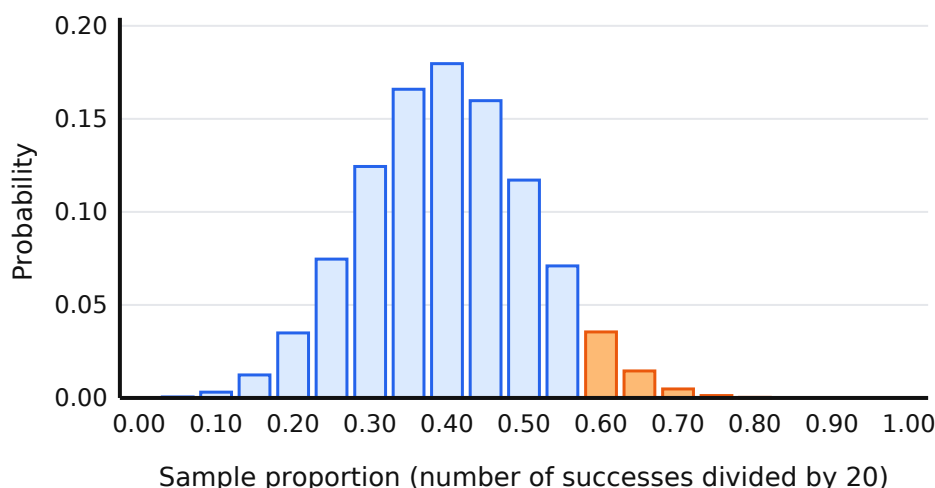
AP Statistics Sampling Distributions Worksheet: problems 11-15

Problem 11: Choosing a sample size

A population has standard deviation $\sigma=20$. What sample size makes the standard deviation of $\bar{x}$ equal to (a) 2? (b) 1?

Problem 12: Exact sampling distribution

For samples of size 20 from a population with $p=0.4$, the exact distribution of $\hat{p}$ is shown. (a) What is the mean of $\hat{p}$? (b) Find $\sigma_{\hat{p}}$. (c) Find $P(\hat{p} \geq 0.60)$ exactly, using $X=20\hat{p}$.



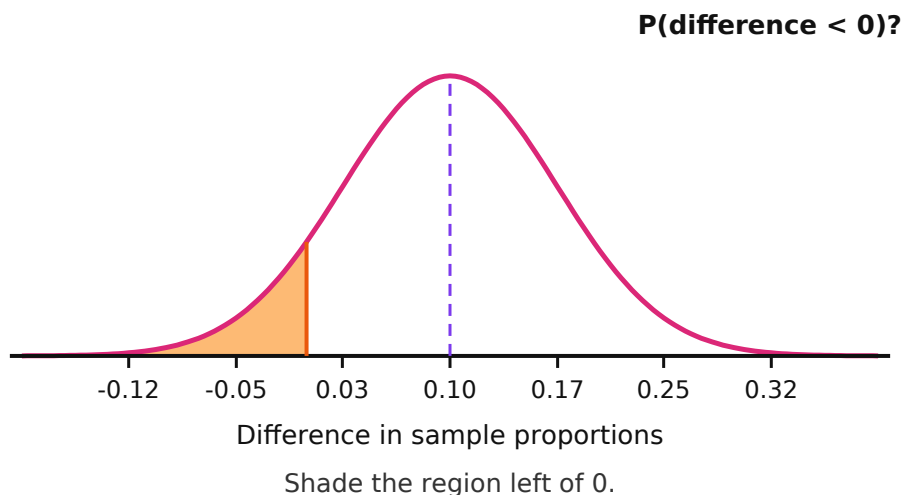
Sampling distribution of the sample proportion, $n=20$.

Problem 13: Difference of two proportions

Sample A: $n_1=80$ from a population with $p_1=0.55$. Sample B: $n_2=100$ from a population with $p_2=0.45$. Find the mean and standard deviation of $\hat{p}_1 - \hat{p}_2$.

Problem 14: Probability of a reversed difference

Use the setting of the previous problem. Find the probability that $\hat{p}_1 - \hat{p}_2$ is negative, so that sample B has the higher proportion. Interpret the result.



Problem 15: Conditions for a difference

Check the conditions for a normal model for $\hat{p}_1 - \hat{p}_2$ in each case. (a) $n_1 = 80$, $p_1 = 0.55$, $n_2 = 100$, $p_2 = 0.45$. (b) $n_1 = 60$, $p_1 = 0.12$, $n_2 = 90$, $p_2 = 0.50$. Assume the samples are independent and random.

AP Statistics Sampling Distributions Worksheet: problems 16-20

Problem 16: Difference of two means

Class A has population mean 82 and standard deviation 10; a random sample of $n_1 = 36$ is taken. Class B has mean 78 and standard deviation 12; a random sample of $n_2 = 45$ is taken. Find the mean and standard deviation of $\bar{x}_1 - \bar{x}_2$.

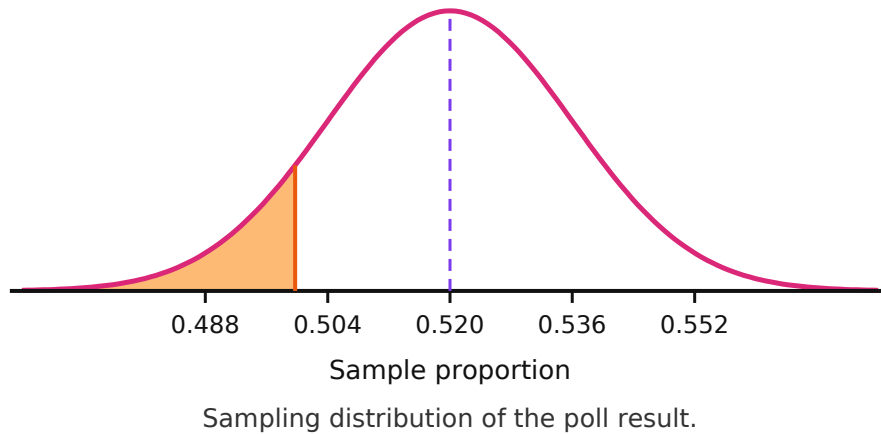
Problem 17: Probability for a difference of means

Using the setting of the previous problem, find $P(\bar{x}_1 - \bar{x}_2 > 6)$. Both samples are large enough for the Central Limit Theorem.

Problem 18: Poll accuracy

In a state, 52% of voters support a candidate. A poll surveys a random sample of 1,000 voters. Find the probability that the poll shows less than 50% support. What does this say about polls?

$P(\hat{p} < 0.50)$?



Problem 19: Bags of flour

A machine fills flour bags with a mean of 5.02 pounds and a standard deviation of 0.06 pound, normally distributed. An inspector checks 9 bags. Find the probability that the mean weight is below the labeled 5.00 pounds.

Problem 20: Phone time

Daily phone time for teenagers is right-skewed with mean 3.1 hours and standard deviation 2.4 hours. A random sample of 64 teenagers is chosen. Find the probability that the sample mean exceeds 3.5 hours.

AP Statistics Sampling Distributions Worksheet: problems 21-23

Problem 21: Margin of error idea

A population has $p=0.50$. For about 95% of samples, $\hat{p}$ falls within 2 standard deviations of p . Find this interval for $n=100$ and for $n=400$, and compare.

Problem 22: Two bakeries

Muffins from Bakery 1 weigh 4.1 ounces on average (standard deviation 0.30); muffins from Bakery 2 weigh 4.0 ounces (standard deviation 0.25). Liam weighs 25 random muffins from Bakery 1 and 30 from Bakery 2. Find the probability that the Bakery 1 sample mean is lower than the Bakery 2 sample mean.

Problem 23: Is the claim plausible?

A company claims that 45% of its customers renew their membership. A random sample of 150 customers (a small part of all customers) shows that 38% renewed. Assuming the claim is true, find the probability of a sample proportion this low or lower. Does this sample cast doubt on the claim?

How to use this ap statistics sampling distributions worksheet

Print this ap statistics sampling distributions worksheet as a PDF, solve every problem on paper, then compare with the answer key.

