

AP Statistics - Sampling Methods and Bias in Surveys - Worksheet

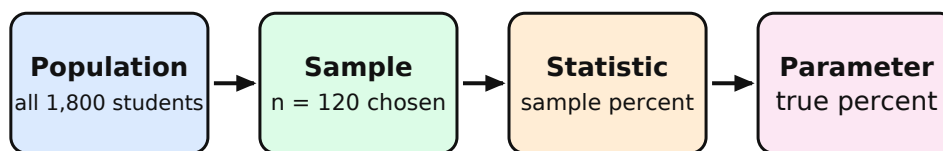
Common Core AP STAT 3.1, AP STAT 3.2, AP STAT 3.3, HSS-IC.B.3 · maths-pdf.fr/en/

Name: _____ Class: _____ Date: ____/____/____

These 20 problems practice AP Statistics topics 3.1 to 3.3. You will distinguish populations and samples, name sampling methods, select random samples with digits, and identify sources of bias in surveys.

AP Statistics · Common Core State Standards: **AP STAT 3.1, AP STAT 3.2, AP STAT 3.3, HSS-IC.B.3**

Exercise 1 - Population, sample, statistic



A statistic describes a sample; a parameter describes a population.

A district official surveys 200 randomly chosen voters from a city with 45,000 voters. Of the 200, 112 support a new bond. Identify the population, the sample, and the sample statistic.

Exercise 2 - Parameter or statistic?

Classify each number as a parameter or a statistic. (a) The mean height of all 1,200 students at a school is 66.2 in. (b) In a sample of 50 students, the mean height was 65.8 in. (c) 40% of all registered voters in a state support a measure. (d) In a poll of 800 voters, 42% support it.

Exercise 3 - Name the sampling method

Name the sampling method: (a) A principal numbers 900 students and uses a random number generator to select 90. (b) A reporter surveys the first 50 people leaving a mall. (c) A school selects 4 homerooms at random and surveys every student in them. (d) A coach randomly selects 5 players from each of 6 teams.

Exercise 4 - SRS with random digits

Random digits
81 53 17 04 77 29 60 12 33 08 94 41 56 22 19

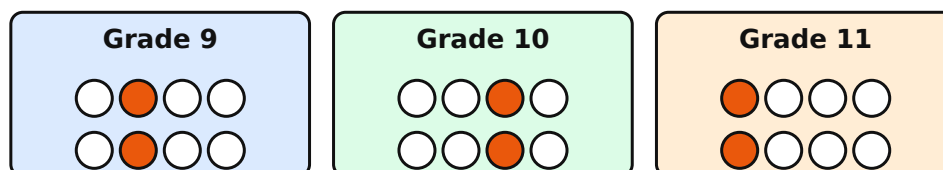
Random digits for the selection.

A club has 60 members labeled 01 to 60. Use the random digits above, in pairs from the left, to select an SRS of 5 members.

Exercise 5 - Systematic sample

A school has 120 students numbered 1 to 120. The principal picks a random start of 5 and then every 8th student. List the students selected and the sample size.

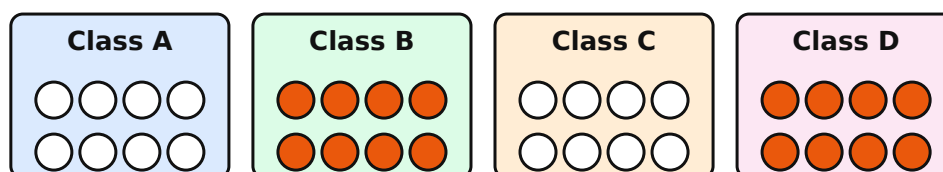
Exercise 6 - Stratified allocation



Stratified random sample: split the population into strata, then take an SRS from every stratum.

A school of 900 students has 300 in Grade 9, 240 in Grade 10, 200 in Grade 11, and 160 in Grade 12. Describe a stratified sample of 60 students that keeps the grade proportions.

Exercise 7 - Cluster or stratified?



Cluster sample: randomly select whole clusters and survey every member of those clusters.

A county has 30 elementary schools. The superintendent randomly selects 4 schools and surveys every teacher in them. Is this stratified or cluster? Why?

Exercise 8 - Convenience sample

Jamal wants to know the favorite sport of his school. He asks 25 students in the gym after practice. Name the sampling method and the likely bias.

Exercise 9 - Voluntary response

A radio show asks listeners to call in about a new parking fee. 85% of 1,200 callers oppose it. Can the station say 85% of residents oppose it?

Exercise 10 - Undercoverage

A survey about internet use calls randomly generated landline numbers during working hours. Identify a source of bias.

Exercise 11 - Nonresponse

A mail survey is sent to 500 randomly chosen households, but only 120 reply. What type of bias is possible, and why?

Exercise 12 - Response bias

Compare two wordings. (A) "Do you support more funding for the school library?" (B) "Do you support raising your taxes to build an unneeded school library?" Which has response bias?

Exercise 13 - Bigger sample

Priya says a voluntary response poll of 10,000 people is more reliable than a random sample of 400. Respond.

Exercise 14 - Describe an SRS procedure

Describe how to take an SRS of 12 students from a list of 150 students.

Exercise 15 - Why stratify?

A school has 80% day students and 20% boarding students, and the two groups may differ in lunch preferences. Why might the school use a stratified sample?

Exercise 16 - Sampling variability

Two different random samples of 100 students give 46% and 52% bus riders. Explain why the statistics differ even though both samples were random.

Exercise 17 - Choose the method

A park manager wants to survey visitors about trail conditions at 20 trailheads (all similar in visitor mix). Planning a trip to every trailhead is costly. Which method is best, and why?

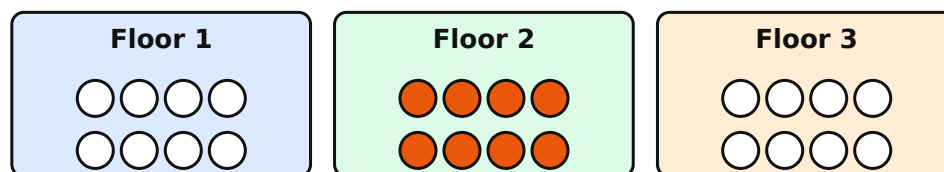
Exercise 18 - Which bias?

Identify the bias: (a) A teacher surveys students about cheating in class, with the teacher watching each answer. (b) A website poll of readers about the site design. (c) A phone poll reaches only 30% of the households called.

Exercise 19 - Multi-step design

A school with 600 freshmen and 400 seniors wants a sample of 50 students that represents both classes. Describe a stratified sample and the sample sizes.

Exercise 20 - Pick the cluster



An apartment building has 3 floors with 8 residents each. The manager rolls a die to pick one floor and surveys all residents there (shown above). How many residents are surveyed? What

weakness might this method have if the floors differ a lot?