

Grade 7 · Random Sampling and Making Inferences · Worksheet

Common Core 7.SP.A.1, 7.SP.A.2 · mathovore.fr

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

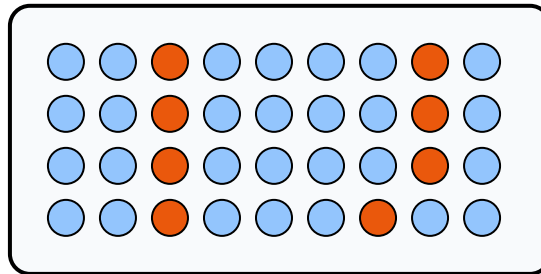
This worksheet has twenty problems on random sampling and inference, aligned with Common Core standards 7.SP.A.1 and 7.SP.A.2. The first problems practice naming populations and samples and spotting biased methods. The middle problems use a sample proportion or a sample mean to estimate a population.

The last problems compare several samples and ask how sample size changes reliability. Write each estimate with the word about, since an estimate is not exact.

Grade 7 Common Core: 7.SP.A.1 · 7.SP.A.2

Problem 1: Population and sample

A middle school has 720 students. Mr. Lopez surveys 45 of them about the length of their bus ride. Identify the population and the sample.



Population: all 720 students
Sample: 45 students surveyed

Figure for Problem 1.

Problem 2: Library books

Ms. Rivera wants to know the average number of pages in the 4,200 books in the school library. She checks 60 of the books. Identify the population and the sample.

Problem 3: Sample or population?

Tell whether each group is a population or a sample. (a) All 28 students in Ms. Chen's class

when she wants the class average on a quiz. (b) 30 shoppers asked at a farmers market about the price of apples in the whole town. (c) Every one of the 1,200 library books when counting damaged books.

Problem 4: Random or not random

Maya wants to survey 30 of the 480 students about their favorite lunch. Tell whether each method gives a random sample. (a) Write all 480 names on slips, mix them in a hat, and draw 30. (b) Ask the first 30 students in the lunch line. (c) Ask 30 members of the cooking club.

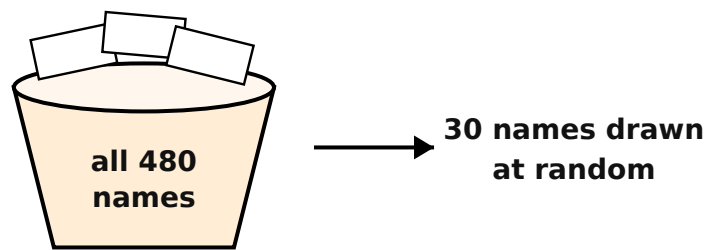


Figure for Problem 4, method (a).

Problem 5: Which sample is better?

Ethan wants to estimate which season the 600 students at his school like best. Method A: ask 40 members of the soccer team. Method B: number the roster from 1 to 600 and use a random number generator to choose 40 numbers. Which method is more likely to give a sample that represents all students? Explain.

Problem 6: Explain the bias

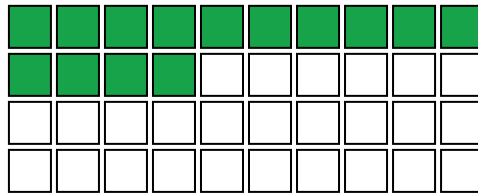
Diego wants to know which sport students in his town like best. He surveys 25 fans leaving a Little League game. Explain why the sample is biased.

Problem 7: Bus stop survey

Aisha wants to know whether adults in her town support a new bus line. She surveys 50 people waiting at a bus stop. Explain why the sample is biased, and describe one way to improve it.

Problem 8: Estimate a population count

In a random sample of 40 students, 14 walk to school. Estimate how many of the 600 students at the school walk.

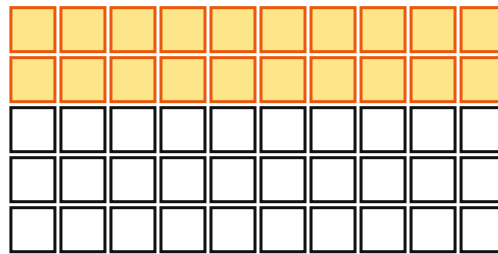


14 of 40 students walk

Figure for Problem 8.

Problem 9: Reusable bags

In a random sample of 50 shoppers at a grocery store, 20 bring reusable bags. Estimate how many of the 1,500 shoppers who visit the store in a week bring reusable bags.

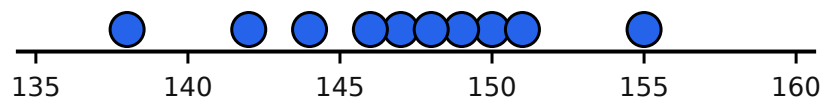


20 of 50 shoppers bring bags

Figure for Problem 9.

Problem 10: Estimate a mean

Priya measures the heights of 10 randomly chosen sunflowers in a large garden, in centimeters: 142, 150, 138, 155, 147, 149, 151, 144, 146, 148. Estimate the mean height of all the sunflowers in the garden.



Sunflower height (cm)

Figure for Problem 10.

Problem 11: Voter survey

A random sample of 80 voters in a town of 2,500 voters is asked about a new library. Of those asked, 52 favor it. Estimate the percent of all voters who favor the library and the number of voters who favor it.

Problem 12: Homework time

Mei asks 8 randomly chosen students from her school of 640 students how many minutes of homework they did last night. The answers are 36, 42, 28, 50, 45, 38, 40, 41. Estimate the mean number of minutes for all students. Then estimate the total minutes of homework the whole school did.

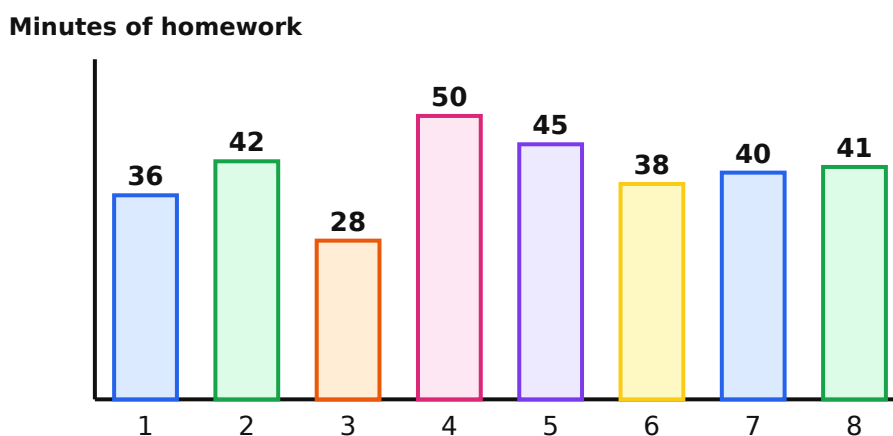


Figure for Problem 12.

Problem 13: Two samples, two estimates

Two random samples of 30 students each were asked if they prefer a later start time. Sample A: 12 said yes. Sample B: 15 said yes. For 900 students, estimate the number who prefer a later start from each sample. Explain why the estimates differ.

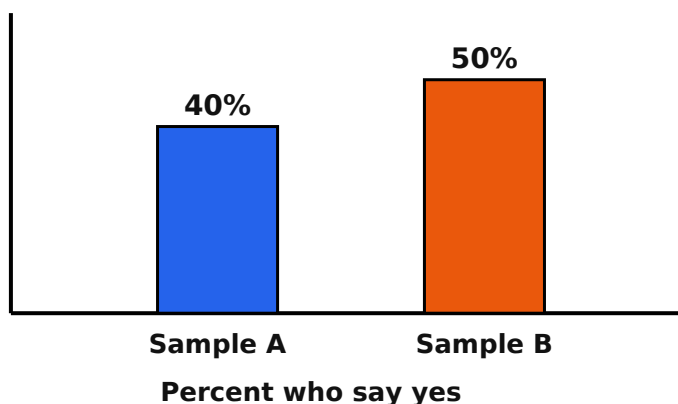
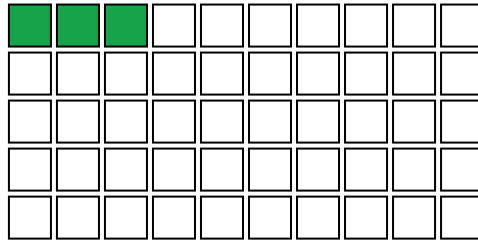


Figure for Problem 13.

Problem 14: Quality control

A factory checks a random sample of 50 light bulbs from a shipment of 4,000 bulbs and finds 3 defective. Estimate how many bulbs in the shipment are defective.



3 of 50 bulbs are defective

Figure for Problem 14.

Problem 15: Sample size

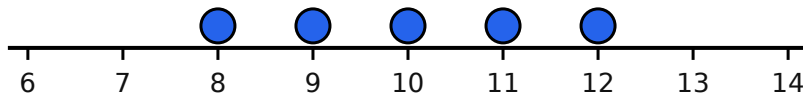
The school has 1,200 students. Liam asks 10 random students about a school dance: 7 say yes. Aisha asks 100 random students: 58 say yes. Estimate the number of students who want the dance from each sample, then tell which estimate is likely more reliable and why.

Problem 16: Does most mean most?

Noah claims that most of the 800 students at his school prefer pizza for lunch. A random sample of 30 students has 17 who prefer pizza. A second random sample of 30 students has 13. (a) Estimate the number of students who prefer pizza from each sample, rounded to the nearest whole number. (b) Decide whether either sample proves Noah is right. (c) Combine the two samples and give a better estimate.

Problem 17: Five samples of lunch buyers

Noah takes five random samples of 20 students each from a school with 1,200 students and counts how many buy lunch: 9,11,8,12,10. (a) Find the mean count. (b) Use it to estimate how many students at the school buy lunch. (c) Use the smallest and the largest counts to give a range of estimates.



Students (out of 20) who buy lunch

Figure for Problem 17.

Problem 18: Burnt cookies

An inspector chooses 80 cookies at random from a batch of 2,400 cookies and finds 6 that are burnt. Estimate how many cookies in the batch are burnt. If each burnt cookie costs the bakery \$0.75, estimate the total loss.

Problem 19: Bass in the pond

A pond holds about 1,250 fish. A ranger catches a random sample of 50 fish and finds 9 bass. A second random sample of 100 fish has 20 bass. Estimate the number of bass in the pond from each sample. Which estimate is likely more reliable, and why?

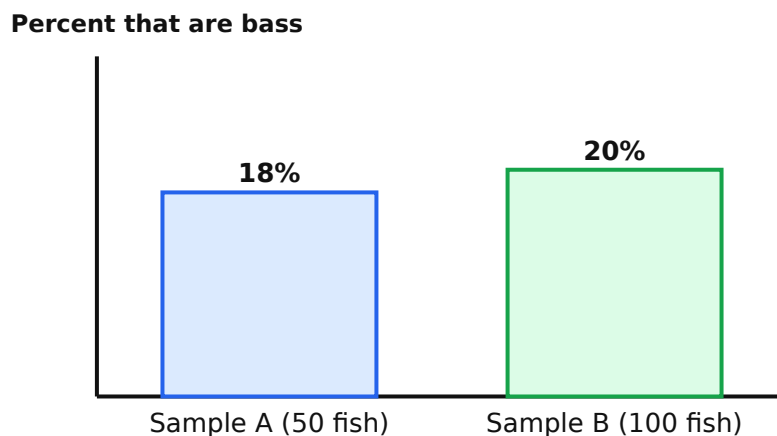


Figure for Problem 19.

Problem 20: New park vote

A town has 12,000 residents. A random sample of 150 residents is asked about a new park, and 96 say yes. Four more random samples of 150 residents give 90, 99, 93 and 107 yes answers. (a) Estimate the number of residents in favor from the first sample. (b) Find the mean of all five counts and use it to estimate again. (c) Use the smallest and largest counts to give a range of estimates.