

Random Samples and Population Inferences

Grade 7 math · Worksheet · Standards: 7.SP.A.1, 7.SP.A.2

Name: _____ Date: _____ Class: _____

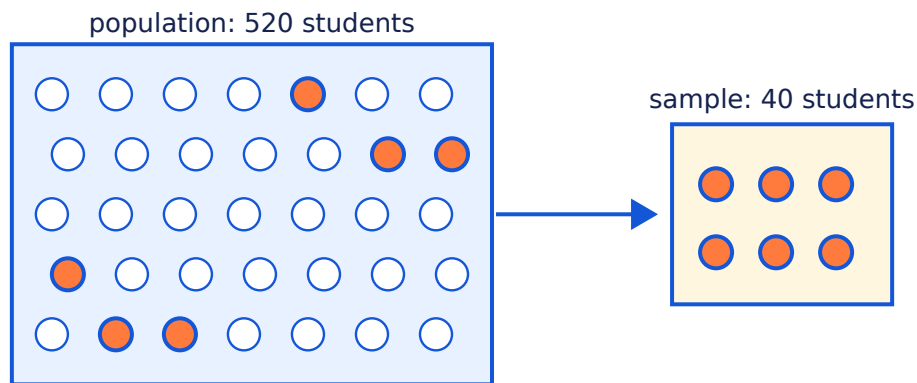
These 20 problems cover populations, samples, random versus biased sampling, and estimating a population from sample data. Standards 7.SP.A.1 and 7.SP.A.2 are the focus.

Problems 1 to 7 build vocabulary and basic estimates. Problems 8 to 14 use means, dot plots and sampling variation. Problems 15 to 20 are multi-step word problems that ask for a plan or a judgment.

Standards: 7.SP.A.1, 7.SP.A.2 · **Level:** Grade 7

Problem 1 Population and sample (easy)

A principal wants to know how seventh graders get to school. She surveys 40 of the 520 seventh graders. Identify the population and the sample.



Population and sample.

Problem 2 Name the population (easy)

A county office tests water from 12 of its 30 public wells. What is the population, and how many items are in the sample?

Problem 3 Fair or biased (easy)

To find out the favorite sport of all students in a school, a reporter asks the first 25 students who arrive at a track meet. Is this a random sample or a biased sample? Explain.

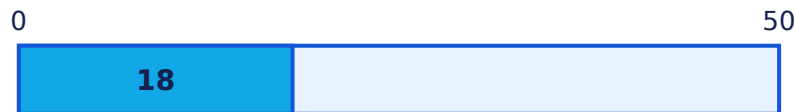
Problem 4 Sort the methods (easy)

Label each method as random or biased for learning about all 300 members of a swim club. (a) Draw 30 names from a bowl holding every member. (b) Ask 30 people leaving the 6 a.m. lap

session. (c) Use a random number generator on the full member list. (d) Post a poll online and use the first 30 replies.

Problem 5 Sample percent (easy)

In a random sample of 50 shoppers, 18 brought reusable bags. What percent of the sample brought reusable bags?



18 of 50 shoppers

18 of 50 shoppers.

Problem 6 Estimate a count (easy)

A school has 1,200 students. In a random sample of 75 students, 30 walk to school. Estimate how many students at the school walk.

Problem 7 Is the conclusion valid (easy)

A survey of the 15 players on a soccer team concludes that most people in town prefer soccer to every other sport. Is the conclusion valid? Give two reasons.

Problem 8 Mean from a sample (medium)

A random sample of 12 apples from a crate of 400 has these weights in ounces: 7, 8, 6, 9, 7, 8, 7, 6, 8, 9, 7, 8. Find the mean weight of the sample and estimate the total weight of the crate.

Problem 9 Defective chargers (medium)

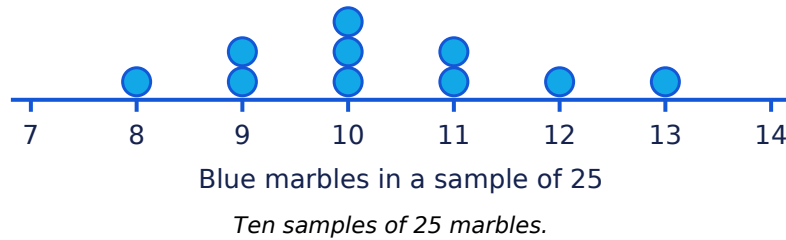
A random sample of 200 phone chargers has 6 defective. A factory made 15,000 chargers. Estimate how many are defective.

Problem 10 Two samples differ (medium)

Two random samples of 20 students each were asked if they like a new school logo. In sample A, 14 said yes. In sample B, 11 said yes. Find the percent for each sample and explain why they differ.

Problem 11 Range of estimates (medium)

Ten random samples of 25 marbles from a jar were taken, and the number of blue marbles in each sample is shown. Find the least and greatest sample percent of blue marbles.



Problem 12 Which sample size (medium)

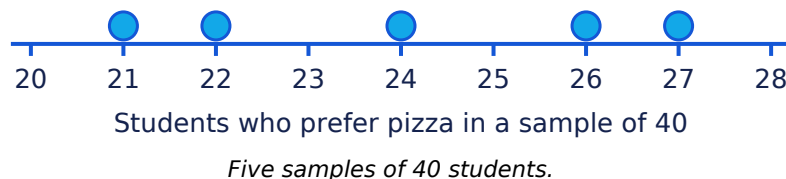
A town council can survey 10 random residents or 100 random residents about a new park. Which sample is more likely to give an estimate close to the whole town? Explain.

Problem 13 Electric cars (medium)

In a random sample of 120 cars parked at a mall, 45 are electric. About 2,400 cars park at the mall each week. Estimate how many are electric.

Problem 14 Five samples of pizza votes (medium)

Five random samples of 40 students from a school of 640 were asked if they prefer pizza. The numbers who said yes were 21, 22, 24, 26 and 27. Find the mean number, the percent it represents, and an estimate for the school.



Problem 15 Infected trees (hard)

A ranger randomly checks 45 trees in a forest of 2,700. In the first sample, 9 trees are infected. In a second random sample of 45 trees, 12 are infected. Estimate the number of infected trees in the forest from each sample, and give an interval that likely holds the true number.

Problem 16 Lunch survey plan (hard)

The cafeteria manager wants to know the favorite lunch of all 650 students. Describe a plan to pick a random sample of 50 students. Then explain why asking the students in the first lunch

period would be a biased plan.

Problem 17 Library visits (hard)

A librarian asks a random sample of 8 patrons how many times they visited last month: 3, 5, 4, 6, 2, 7, 5, 4. The library has 1,200 patrons. Estimate the total number of visits last month.

Problem 18 Combine three samples (hard)

Three random samples of 30 students each were asked if they use online homework tools. The numbers who said yes were 12, 15 and 9. Find the percent of the combined sample and estimate how many of the 1,450 students in the school use them.

Problem 19 Start time poll (hard)

At Lincoln Middle School, a random sample of 40 of the 480 students found that 26 want a later start time. A board member says that about 65% of all 1,900 students in the district want a later start. (a) Estimate how many students at Lincoln want a later start. (b) Is the board member justified? Explain.

Problem 20 Bulb quality (hard)

A factory tests five random samples of 100 bulbs, with 4, 6, 3, 5 and 7 defective bulbs. It will make 8,000 bulbs. Find the mean number defective, the estimated number of defective bulbs, and the range of the estimates from the least to the greatest sample.



Defective bulbs in a sample of 100

Five samples of 100 bulbs.