Populations and Samples

Spot mistakes, reason, and work backward

Name _____ **Date** _____ **Score** _____ / 8

QUICK REVIEW

The population is the whole target group; the sample is the group actually studied. Surveying 40 randomly chosen students from 400 samples $40/400 = 1/10$ of the population. Random selection helps avoid bias; a larger convenience sample may still be biased. No sample guarantees exact population results.

Worked example

A town has 900 households; 90 are randomly surveyed. Identify population, sample, and fraction.

1. All 900 households form the target population.
2. The 90 surveyed households form the sample.
3. Sample fraction $= 90/900 = 1/10 = 10\%$.
Answer: Population 900; sample 90; fraction $1/10$.

Practice Problems

Show your thinking.

1. Library hours: A report reverses population and sample sizes $1000, 60$. Repair the labels and find the sampled fraction.

2. Library hours: A report calls the first 60 cardholders who visit on Saturday a random sample of all 1000 cardholders because there are many responses. Correct the method, not merely its size.

3. Library hours: A random program draws 60 member numbers from 1 to 1000 with repeats allowed. Explain why it may reach fewer than 60 people and repair the selection.

4. Library hours: A survey of two equal grades totaling 1000 students takes all 60 respondents from one grade. Design an equal random allocation and check its total.

5. Library hours: A student says surveying 120 randomly from 1000 guarantees the exact population preference. Compare sample fractions for 60 and 120 and correct the guarantee.

6. Library hours: A 60-person volunteer poll and a random poll have the same fraction of 1000 students. Explain why identical fractions do not remove volunteer bias.

7. On a list of 960 households, 96 distinct households volunteered. A report calls this random because the sample is 10%. Explain the problem and give a random selection repair.

8. A survey takes 20 from each of groups with $300, 200, 100$ students. For a proportional 60-student sample, repair the allocations.

Answer Key

1. Population 1000; sample 60; sampled fraction $\frac{3}{50}$.

2. Population 1000; sample 60; sampled fraction $\frac{3}{50}$. Prefer random cardholders; Saturday visitors may have different availability.

3. 940 unselected. Draw 60 distinct numbers from the full list.

4. 30 per grade, 60 total; within-grade fraction $\frac{3}{50}$.

5. Fractions $\frac{3}{50}$ and $\frac{3}{25}$; larger random sample is generally more stable, not guaranteed exact.

6. Population 1000; sample 60; sampled fraction $\frac{3}{50}$. No; players or volunteers can have different preferences from nonparticipants.

7. Population 960, sample 96, sampled $1/10$, not contacted 864 $(9/10)$. Use distinct random household numbers, not volunteers.

8. Allocations $30, 20, 10$; total 60. Select randomly within each group.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. The target population has 1000 members, with $1000 - 60 = 940$ outside the intended sample.

2. The sample has 60 distinct members; fraction $60/1000 = \frac{3}{50}$.

3. A random sample from the whole list gives all members a selection chance; a convenience group can miss systematically different members.

Problem 2

1. The target population has 1000 members, with $1000 - 60 = 940$ outside the intended sample.

2. The sample has 60 distinct members; fraction $60/1000 = \frac{3}{50}$.

3. A random sample from the whole list gives all members a selection chance; a convenience group can miss systematically different members.

Problem 3

1. Give each of the 1000 members one unique number from 1 to 1000. The full list is in the draw, so every member is eligible.

2. Draw 60 different numbers without replacement. With replacement, duplicate draws could count the same person twice.

3. Exactly 60 people are contacted, leaving $1000 - 60 = 940$ unselected.

Problem 4

1. Split the 60 interviews into two equal random groups: $60/2 = 30$ per grade. Check $30 + 30 = 60$.

2. Each grade has $1000/2 = 500$ students.

3. Within-grade fraction $30/500 = \frac{3}{50}$ is the same in both grades.

Problem 5

1. The target population has 1000 members, with $1000 - 60 = 940$ outside the intended sample.

2. The sample has 60 distinct members; fraction $60/1000 = \frac{3}{50}$.

3. Larger fraction $120/1000 = \frac{3}{25}$ reduces typical sampling variation but cannot eliminate it.

Problem 6

1. The target population has 1000 members, with $1000 - 60 = 940$ outside the intended sample.

2. The sample has 60 distinct members; fraction $60/1000 = \frac{3}{50}$.

3. A random sample from the whole list gives all members a selection chance; a convenience group can miss systematically different members.

Problem 7

1. The whole target is all 960 households; sample fraction $96/960 = 1/10$.

2. Not surveyed $960 - 96 = 864$; fraction $864/960 = 9/10$.

3. Number households 1 through 960 and select 96 distinct random numbers; volunteer selection does not give everyone the same chance.

Problem 8

1. Population total $300 + 200 + 100 = 600$; sample rate $60/600 = 1/10$.

2. Group counts $300/10 = 30$, $200/10 = 20$, $100/10 = 10$.

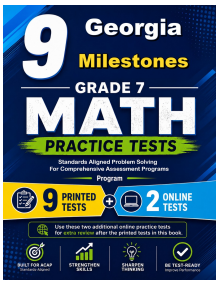
3. Check $30 + 20 + 10 = 60$; each group has the same 10% sampling rate when members are selected randomly.

TESTINAR

Keep Building Grade 7 Math Skills

Choose the practice book matched to your state assessment and turn worksheet practice into a complete test-prep plan.

All Grade 7 books



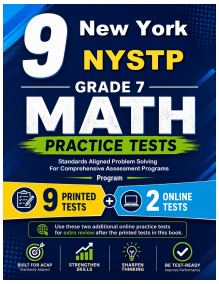
GEORGIA MILESTONES

9 Full-Length Math Practice Tests

Build Grade 7 accuracy, confidence, and test stamina with 9 printable practice tests.

Printable eBook • Instant PDF access

View eBook



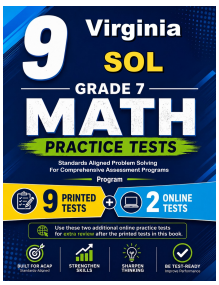
NEW YORK NYSTP

9 Full-Length Math Practice Tests

Build Grade 7 accuracy, confidence, and test stamina with 9 printable practice tests.

Printable eBook • Instant PDF access

View eBook



VIRGINIA SOL

9 Full-Length Math Practice Tests

Build Grade 7 accuracy, confidence, and test stamina with 9 printable practice tests.

Printable eBook • Instant PDF access

View eBook

Need a different state?
Testinar has Grade 7 math practice books for state assessments across the country.

TESTINAR.COM/GRADES/7