

Grade 7 · Random Sampling and Making Inferences · Test Answer Key

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

Use this key to score the test out of 20 points. Each solution shows the proportion or mean used for the estimate, and each scoring note explains how partial credit is given. For explanation questions, accept any correct reasoning about equal chance of selection, bias, or sample size.

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

Question 1: Population and sample (2 points)

Population: all 2,400 muffins sold that month. Sample: the 36 muffins that were weighed.

Scoring: 1 point for the population; 1 point for the sample.

Question 2: Random or biased? (2 points)

(a) Biased: only students who choose to reply are included, and they may sleep differently from other students.

(b) Random: every student has an equal chance of being picked.

Scoring: 1 point for each method correctly classified with a valid reason.

Question 3: Explain the bias (2 points)

Callers choose themselves, and people with strong opinions are most likely to call. Not every resident had an equal chance of being included, so the sample is biased and does not represent the town.

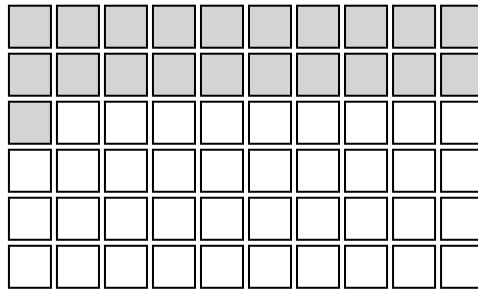
Scoring: 1 point for identifying self-selection (or that not everyone had a chance); 1 point for explaining that the sample does not represent the population.

Question 4: Estimating a proportion (3 points)

Proportion: $\frac{21}{60} = 0.35$.

Estimate: $0.35 \times 1800 = 630$.

About 630 students



21 of 60 = 35%

Solved: 35% of the sample owns a pet.

Scoring: 1 point for the proportion 0.35; 1 point for multiplying by 1800; 1 point for 630.

Question 5: Estimating a mean (2 points)

Sum: $18+22+20+25+19+22=126$. Mean: $126 \div 6 = 21$.

About 21 ft

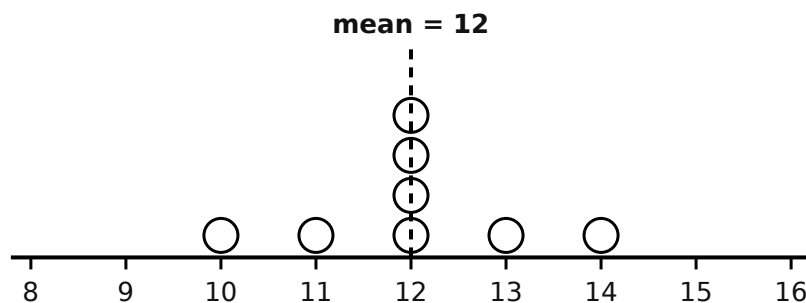
Scoring: 1 point for the sum 126; 1 point for the estimate 21 ft.

Question 6: Variation among samples (3 points)

(a) Largest 14, smallest 10: range $14-10=4$.

(b) Sum: $11+13+12+14+12+10+12+12=96$, and $96 \div 8 = 12$. Proportion: $\frac{12}{25} = 0.48$, and $0.48 \times 2000 = 960$.

(a) 4; (b) about 960 customers



Customers (out of 25) who prefer chocolate

Solved: the mean is 12 of 25.

Scoring: 1 point for (a); 1 point for the mean 12; 1 point for the estimate 960.

Question 7: Sample size (2 points)

Mei's estimate is likely closer. A larger random sample varies less from sample to sample, so it tends to be closer to the population value.

Scoring: 1 point for choosing Mei; 1 point for a reason about larger samples varying less.

Question 8: Design and use a survey (4 points)

(a) Sample answer: Number the students 1 to 360 on a roster. Use a random number generator to pick 24 different numbers, and survey those students. Every student has the same chance.

(b) $\frac{9}{24} = 0.375$, and $0.375 \times 360 = 135$.

(b) About 135 students

Scoring: (a) 1 point for a method where chance decides; 1 point for giving every student an equal chance. (b) 1 point for 0.375; 1 point for 135.

Total
20 points