

Foundation Check In - 12.01 Sampling

1. Rashid's school has 1500 students. He wants to take a 5% sample. How many students should be in the sample?
2. Out of all the people using a train station one day, Anna decides to survey all the people on one train. What statistical term is given to "All the people using a train station in a day"?
3. These are the results of a representative survey to see what percentage of people would attend a cinema screening of a live gig by a band.

Age group (years)	15 to 18	19 to 25	26 to 40	41 to 59
Percentage who would attend screening	6%	8%	4%	2%

There are 16 000 people in the town aged 15 to 18. How many of these people are likely to attend the screening?

4. Mo reads on a website that a film is rated '5 stars out of 5!' by users of the website. What piece of information about the rating might he want to know to judge how reliable it is?
5. From the 2500 people working for a company, 225 people are sampled. What percentage sample has been chosen?
6. Explain how a simple random sample can be taken from all the people using a library in a day.
7. Cala wants to survey opinion in a town about a new nightclub. She decides to interview every 10th person coming out of the nightclub. Explain, giving reasons, if this survey is likely to be representative of opinion in the town.
8. A company that sells chocolate advertises online for volunteers to take a survey in which they will be asked to eat and compare types of chocolate. Are the volunteers likely to be a fair or biased sample? Explain your reasons.
9. The table shows a sample of students attending a sixth form college, collected so that the proportion of people in each group in the sample is the same as the proportion of people in that group for the population. If the sixth form college has 1500 students, how many girls are in year 13?

	Year 12	Year 13
Boys	30	20
Girls	25	25

10. A forestry manager needs to estimate the number of squirrels in a wood. He catches 20 squirrels, tags them and releases them. A week later he catches another 20 squirrels and finds that 5 of these are tagged. Use the fact that $\frac{5}{20}$ or $\frac{1}{4}$ of the squirrels he caught were tagged to estimate the number of squirrels in the wood. What does the manager assume?



GCSE (9–1) MATHEMATICS

Extension

A farmer, near a small town where 1250 people live, plans to open a farm shop. He wants to estimate the number of people who would use it.

One evening he telephones 50 people and asks, “Would you use a farm shop?” 15 people said they would.

He estimates that $\frac{15}{50} \times 1250 = 375$ people would use the shop in a week.

Criticise this method and conclusion.



Answers

1. 75
2. Population
3. 960
4. How many users have given it this rating
5. 9%
6. E.g. Interview every 20th person coming out of the library throughout the day.
7. Unlikely to be representative as it will only sample people who use the nightclub. (It is biased)
8. Likely to be biased as it will only draw on people who like chocolate or people having access to a computer.
9. $\frac{25}{100} \times 1500 = 375$ girls in year 13
10. $\frac{1}{4}$ (i.e. 25%) of the squirrels in the second sample from the population are tagged, so we can estimate that $\frac{1}{4}$ (i.e. 25%) of the whole population are tagged. There are 20 tagged squirrels in the whole population, so an estimate of the whole population size is $20 \times 4 = 80$.

He assumes that the second sample is representative of the whole population.

Extension

(NB: There may be other valid reasons)

This is a small survey so may not be representative.

The survey only contacts people with a telephone (about 14% of people in UK don't have one).

Of the 1250 people in the town, many will be children and there will be many families.

He did not ask how often people would use the shop so he cannot expect these people to use the shop every week.

People may not be telling the truth.



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Assessment Objective	Qu.	Topic	R	A	G
AO1	1	Calculate a sample from a population			
AO1	2	Define the population in a study			
AO1	3	Infer properties of populations			
AO1	4	Understand bias in sampling			
AO1	5	Understand simple random sampling			
AO2	6	Interpret simple random sampling			
AO2	7	Interpret bias in a sample			
AO2	8	Interpret bias in populations			
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