Population, census and sample

Grade 3 | Worked solutions

GCSE Statistics topic practice

1 Marcus wants to find out the favourite sport of the pupils in Year 10 at his school. There are 180 pupils in Year 10. He asks every one of them.

a. Write down the name for a survey that collects data from every member of the population. (1)

b. Give one advantage of asking every pupil in Year 10. (1)

c. Give one disadvantage of asking every pupil in Year 10. (1)

(3 marks)

a) every member of the population is asked

A census

b)

Every pupil is included

so the results are accurate

c)

It takes a long time to ask all 180 pupils

a) census b) accurate, no bias c) takes a long time

2 A head teacher wants to find out what the 900 pupils at her school think about school lunches. She asks 50 of the pupils.

a. Write down the population for this investigation. (1)

b. Is the head teacher taking a census or a sample? (1)

c. Give one advantage of asking 50 pupils instead of all 900 pupils. (1)

d. Give one disadvantage of asking only 50 pupils. (1)

(4 marks)

a) everyone she wants to find out about

All 900 pupils at the school

b)

She only asks part of the population

It is a sample

c)

It is quicker and there is less data to handle

d)

The 50 pupils may not represent

the views of the whole school

a) 900 pupils b) sample c) quicker d) not representative

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3 Priya wants to find out how often the adults in her town go swimming. There are 12 000 adults in the town. She asks 40 people as they leave the swimming pool on a Monday morning.

a. Write down the population for Priya's investigation. (1)

b. Give two reasons why Priya's sample may be biased. (2)

c. Write down one way Priya could improve her sample. (1)

(4 marks)

a) everyone she wants to find out about

ALL 12 000 adults in the town

b)

Everyone she asks has just been swimming

so people who never swim are left out

On a Monday morning people at work

cannot be in the sample

c)

Ask people in different places in the town

on different days and at different times

a) all adults b) only pool users, Monday am c) vary place

4 A factory makes 5000 light bulbs each day. To find out how long the bulbs last, a tester takes a sample of 200 of the bulbs and leaves them switched on until they stop working.

a. Explain why the factory does not test every bulb in this way. (1)

b. Work out the percentage of the 5000 bulbs that are in the sample. (2)

c. 6 of the 200 bulbs in the sample last for less than 1000 hours.
Work out an estimate for the number of the 5000 bulbs that last for less than 1000 hours. (2)

(5 marks)

a)

The test uses up every bulb that is tested

There would be no bulbs left to sell

b) sample ÷ population × 100

$$\frac{200}{5000} \times 100 = 4\%$$

c) how many times bigger is the population

$5000 \div 200 = 25$

$6 \times 25 = 150$

a) no bulbs left to sell b) 4% c) 150 bulbs

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5 A village has 1500 residents. The council wants to know if the residents want a new cycle path. It asks a sample of 10% of the residents. The table shows the answers.

Answer	Yes	No	Not sure
Number of residents	96	39	15

a. Work out the number of residents in the sample. (1)

b. Work out the percentage of the sample who answered Yes. (2)

c. A councillor says, "This proves that most of the residents in the village want the cycle path."
Give one reason why this may not be correct. (1)

d. Write down one way the council could make its results more reliable. (1)

(5 marks)

a) 10% of 1500

$1500 \div 10 = 150$

b) number who said Yes ÷ sample size × 100

$\frac{96}{150} \times 100 = 64\%$

c)

Only 150 of the 1500 residents were asked

The others may have different views

d)

Ask a bigger sample of the residents

a) 150 b) 64% c) only a sample d) bigger sample

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