Statistics: 10 practice questions

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Name: _____ Date: _____

Attempt all questions and show your working. Suggested time: 15 to 20 minutes.

Section A: Consolidating (Questions 1-4)

Question 1

A school wants to know the favourite sport of its 600 students. It asks 50 of these students.

(a) What is the population?

(b) What is the sample?

(c) What is the sample size?

Question 2

State whether each of these is a census or a sample.

(a) Every household in Australia fills in a form about the people living there.

(b) A quality checker tests 20 light globes from a batch of 5000.

(c) A teacher measures the height of every student in her class of 25 to find the class's mean height.

(d) A polling company phones 1000 voters to predict an election result.

Question 3

Choose the data collection method being used in each case: census, sample survey, experiment or observation.

(a) Counting the number of cars that pass the school gate between 8 am and 9 am.

(b) Giving plant food to 10 of 20 tomato plants, then comparing the heights of the two groups after six weeks.

(c) Asking 100 randomly chosen shoppers how much they spend on groceries each week.

Question 4

In a sample of 40 students, 12 walk to school. What percentage of the sample walk to school?

Section B: Standard (Questions 5-10)

Question 5

Explain why a sample, rather than a census, would be used in each situation.

(a) A car maker crash tests its new cars to check they are safe.

(b) A researcher wants the mean mass of the fish in a large lake.

Question 6

(a) Give one advantage of using a census instead of a sample.

(b) Give one advantage of using a sample instead of a census.

Question 7

A school has 960 students. In a random sample of 80 of these students, 24 said they buy lunch from the canteen at least once a week.

(a) What proportion of the sample buy lunch from the canteen at least once a week? Give your answer as a decimal.

(b) Estimate how many students in the whole school buy lunch from the canteen at least once a week.

Question 8

A factory makes a batch of 12,000 phone chargers. A random sample of 250 chargers is tested and 5 are found to be faulty. Estimate the number of faulty chargers in the whole batch.

Question 9

A local council wants to find out whether residents support building a new skate park. There are 18,000 households in the council area. The council sends a survey to 400 randomly chosen households.

(a) What is the population?

(b) What is the sample?

(c) Give one reason the council did not survey every household.

Question 10

Two researchers want to know how people choose between the stairs and the escalator at a train station.

Researcher A stands at the station and records how many people use the stairs and how many use the escalator.

Researcher B puts up a sign saying "Take the stairs for your health" on some days and not on other days, then compares how many people use the stairs.

(a) Which researcher is carrying out an experiment, and which is carrying out an observation?

(b) Explain the main difference between an experiment and an observation.

Statistics: answers

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Question 1

Answer: (a) All 600 students at the school (b) The 50 students who were asked (c) 50

Question 2

Answer: (a) Census (b) Sample (c) Census (d) Sample

Question 3

Answer: (a) Observation (b) Experiment (c) Sample survey

Question 4

Answer: 30% (12/40 = 0.3)

Question 5

Answer: (a) Crash testing destroys the car, so testing every car would leave none to sell. (b) It is impossible, or far too costly and slow, to catch every fish in the lake.

Question 6

Answer: (a) A census collects data from every member, so the result is exact for the population (no sampling error). (b) A sample is cheaper, quicker and easier to carry out. (Any valid advantage is accepted for each part.)

Question 7

Answer: (a) 0.3 (24/80) (b) 288 students (0.3 × 960)

Question 8

Answer: 240 (5/250 × 12,000)

Question 9

Answer: (a) All 18,000 households in the council area (b) The 400 randomly chosen households that were sent the survey (c) Surveying every household would cost too much or take too long (any sensible reason about cost, time or effort).

Question 10

Answer: (a) Researcher A: observation. Researcher B: experiment. (b) In an experiment the researcher deliberately changes something (here, the sign) and measures the effect; in an observation the researcher only records what happens without changing anything.