



Sampling

About 45 minutes Calculator allowed 39 marks

Date _____

A Do Now

The first question is what today's lesson needs. The others bring back earlier topics.

- A1** Needed today [2 marks] **A2** From chapter 8 [2 marks]
 $\frac{3}{8}$ of a number is 36. What is the number? Make x the subject of $y = \frac{4}{x} - 5$.

Answer

Answer

- A3** From chapter 3 [2 marks] **A4** From chapter 14 [2 marks]
A pie chart for 72 boys shows swimming with an angle of 105° .
A pie chart for 36 girls shows swimming with an angle of 70° .
How many more boys than girls chose swimming? Work out
 $8.4 \times 10^{-3} + 7.6 \times 10^{-4}$. Give your answer in standard form.

Answer

Answer

B Example, then your turn

Your teacher works through each example with you. Then try the one beside it.

EXAMPLE 1

A club of 960 has 384 adults, 336 students and 240 seniors. How many of each go in a stratified sample of 40?

Hint Find the fraction sampled, then take that fraction of each group.

- B1** A gym of 750 has 300 bronze, 270 silver and 180 gold members. How many of each go in a stratified sample of 50? [3 marks]

Answer bronze ... silver ... gold ...

EXAMPLE 2

A stratified sample of 48 from a club includes 6 of its 90 juniors. How many members does the club have?

Hint The fraction of juniors sampled is the fraction of the club sampled.

B2 A stratified sample of 35 from a hospital includes 8 of its 112 part-time staff. How many staff does the hospital have? [3 marks]

Answer

c Practice

C1 A council asks 200 drivers in a car park whether the town needs more buses. Give one reason the sample may be biased. [1 mark]

C2 A school of 1350 takes a random sample of 54. Find the probability that a given student is chosen, in its simplest form. [2 marks]

Answer

C3 A factory has 1200 workers and 228 work nights. How many night workers are in a stratified sample of 75? [2 marks]

C4 Students are numbered 001 to 650. These random numbers are read: 427, 083, 711, 427, 650, 000. Which students are picked? [2 marks]

Answer

Answer

C5 A head teacher wants to know what the school's 1200 students think of a new timetable. Give one advantage and one disadvantage of asking a sample of students instead of all 1200. [2 marks]

C6 A college has 900 students. Describe how the college could take a random sample of 45 students. [2 marks]

D Exam-style questions

D1 A club has 120 juniors and 360 adults. Leah asks 20 juniors and 20 adults. She says, "My sample of 40 is stratified because it has both groups." [3 marks]

Explain why Leah is wrong, and work out a stratified sample of 40.

- D2** The table shows the staff at a firm's two sites. A sample of 50 staff is taken, stratified by site and by contract.

	Full-time	Part-time
Site A	168	72
Site B	216	144

- (a) How many part-time staff from Site B are in the sample? [2 marks]

Answer

- (b) The firm then takes on more part-time staff at Site A. With the same fraction, [2 marks]
the sample now holds 9 part-time staff from Site A. How many more part-time staff are there at Site A?

Answer

Total for D2: 4 marks

- D3** A festival has 2400 visitors. A sample of 60 visitors is asked how they travelled there, and 21 of them came by train.

- (a) Estimate the number of the 2400 visitors who came by train. [2 marks]

Answer

- (b) The sample was taken at the exit of the railway station. Will your estimate in (a) [1 mark]
be too high or too low? Give a reason.

Total for D3: 3 marks

E Extension

No route is given. The hints are at the end of the sheet. Use one at a time.

- E1** A stratified sample of 69 people is taken from three groups. Group A has 252 [4 marks]
people and 21 of them are in the sample. The sample holds three times as many
people from group B as from group C. How many people are in group C?

Answer

Extension hints

Cover these with paper. Uncover one at a time.

- E1** **Hint 1** Find the fraction of group A that is sampled. It is the same fraction for every group.
- Hint 2** $\frac{21}{252} = \frac{1}{12}$, and groups B and C have $69 - 21 = 48$ people in the sample.
- Hint 3** Sample from C is $48 \div 4 = 12$, so group C has $12 \times 12 = 144$ people.

How did it go?

Colour one circle on each line: not yet, nearly, yes.

I can work out how many of each group go in a stratified sample. ☐ ☐ ☐

I can work back from a sample to the size of the population. ☐ ☐ ☐

I can say why a sample may be biased. ☐ ☐ ☐