Name:

Exam Style Questions

Stratified Sampling

Corbettmaths

Equipment needed: Pen, Calculator

Guidance

1. Read each question carefully before you begin answering it.
2. Check your answers seem right.
3. Always show your workings

Video Tutorial

www.corbettmaths.com/contents

Video 281

Answers and Video Solutions

1. The table shows information about the inhabitants of a village.

Age	Population Size
0 - 20	693
21 - 40	1203
41 - 60	802
Over 60	405

+ 3103

Bernard is going to carry out a survey about the local library.
He wants to find out how often people have been to the library in the last year.

Bernard decides to take a stratified sample.

(a) Explain why it is appropriate to take a stratified sample.

There are significantly different amounts of people in each group.

(1)

Bernard takes a stratified sample of 100.

(b) Calculate the number of each age group that Bernard should choose.

$\frac{693}{3103} \times 100 = 22.33...$

$\frac{1203}{3103} \times 100 = 38.7689...$

$\frac{802}{3103} \times 100 = 25.84...$

$\frac{405}{3103} \times 100 = 13.05...$

0 - 20 ..22..

21 - 40 ..39..

41 - 60 ..26..

Over 60 ..13..

(3)

2. There are 180 employees in a school.

The table shows the number of each type of employee in the school.

Teachers	Teaching Assistants	Admin	Other
94	16	41	29

(a) A stratified sample of size 50 is required.
Calculate the number of each type of employee that should be chosen.

$\frac{94}{180} \times 50 = 26.1...$

$\frac{16}{180} \times 50 = 4.4...$

$\frac{41}{180} \times 50 = 11.388...$

$\frac{29}{180} \times 50 = 8.055...$

Teachers ..... 26 .....

Teaching Assistants ..... 5 .....

Admin ..... 11 .....

Other ..... 8 .....

(3)

(b) Describe a method to obtain a stratified sample of size 50 from the employees in the school.

Assign each member of staff a number (e.g. teachers 1 to 94, teaching assistants 95 to 110 etc). Then choose 26 numbers (at random perhaps) from 1 to 94, 5 numbers from 95 to 110 and so on.

(2)

3. The table shows the home countries of rugby referees on a course.

Ireland	Wales	Scotland
8	28	44

80

÷8 1 3·5 5·5

(a) David wants to take a stratified sample of size 10 from the referees.

Calculate the number of referees from each country that David should select.

Ireland $8 \div 8 = 1$

Wales $28 \div 8 = 3.5$

Scotland $44 \div 8 = 5.5$

Ireland 1 1

Wales 4 or 3

Scotland 5 6

(3)

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4. There are 300 students in years 7, 8, 9 and 10 in a school.

Year 7	Year 8	Year 9	Year 10
72	108	66	54

÷6 12 18 11 9

A stratified sample of 50 is planned.

Calculate the number of people that should be sampled from each year group.

$300 \div 6 = 50$

Year 7 12

Year 8 18

Year 9 11

Year 10 9

(3)

5. Declan works in a confectioners.
He is asked to test a sample of 40 chocolates stratified by type of chocolate.
The table shows the number of each type of chocolate in the shop.

Type	Milk	Dark	White
Number	600	220	130

total
950

Calculate the number of dark chocolates required for his stratified sample.

$\frac{220}{950} \times 40 = 9.263..$

9

.....

(3)

6. The table shows information about the vehicles sold by a dealership.

Car	Van	Motorbike	Caravan
677	109	82	14

total
882

The manager takes a sample of 50 customers, stratified by type of vehicle sold.

Calculate the number of each vehicle type in the sample.

Car $\frac{677}{882} \times 50 = 38.378..$

Van $\frac{109}{882} \times 50 = 6.179..$

Motorbike $\frac{82}{882} \times 50 = 4.648..$

Caravan : $\frac{14}{882} \times 50 = 0.79..$

Car ..38..

Van ..6..

Motorbike ..5..

Caravan ..1..

(3)

7. There are 300 passengers on a flight.
Each passenger sits in an economy, business or premium seat.
A stratified sample is taken.

The table shows some information.

	Economy	Business	Premium
Number on flight	132	108	60
Number in sample	22	18	10

÷6 ↷

Complete the table.

(3)

8. A cricket club has 400 members.
A stratified sample of member is taken, by age group.
The table shows some information.

Age Group

	0 - 17	18 - 39	40 - 59	60+
Members	75	100	120	105
Number in sample	15	20	24	21

÷5 ↷

Complete the table.

(3)

9. A teacher decides to carry out a survey about school dinners.
She is going to ask students in year 4, year 5 and year 6.

The numbers in the school are shown.

Year 4	Year 5	Year 6
100	120	135

Total: 355

A stratified sample is taken.
40 year 4 students are selected.

Work out the number of year 6 students selected.

$\frac{100}{355} \times n = 40$

$100n = 14200$

$n = 142$

$\frac{135}{355} \times 142 = 54$

54

.....

(2)

10. Here is some information about the colour of raffle tickets sold.

Red	Yellow	Blue
490	70	140

÷35 ↓ 14 2 4

total 700

A sample of 20 tickets, stratified by colour is taken.

From this sample, Jason choosing two winning tickets at random.

Work out the probability that the two tickets are the same colour.

$700 \div 35 = 20$

$P(RR) = \frac{14}{20} \times \frac{13}{19} = \frac{182}{380}$

$P(YY) = \frac{2}{20} \times \frac{1}{19} = \frac{2}{380}$

$P(BB) = \frac{4}{20} \times \frac{3}{19} = \frac{12}{380}$

$\frac{196}{380} = \frac{49}{95}$

$\frac{196}{380}$ or $\frac{49}{95}$

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(6)