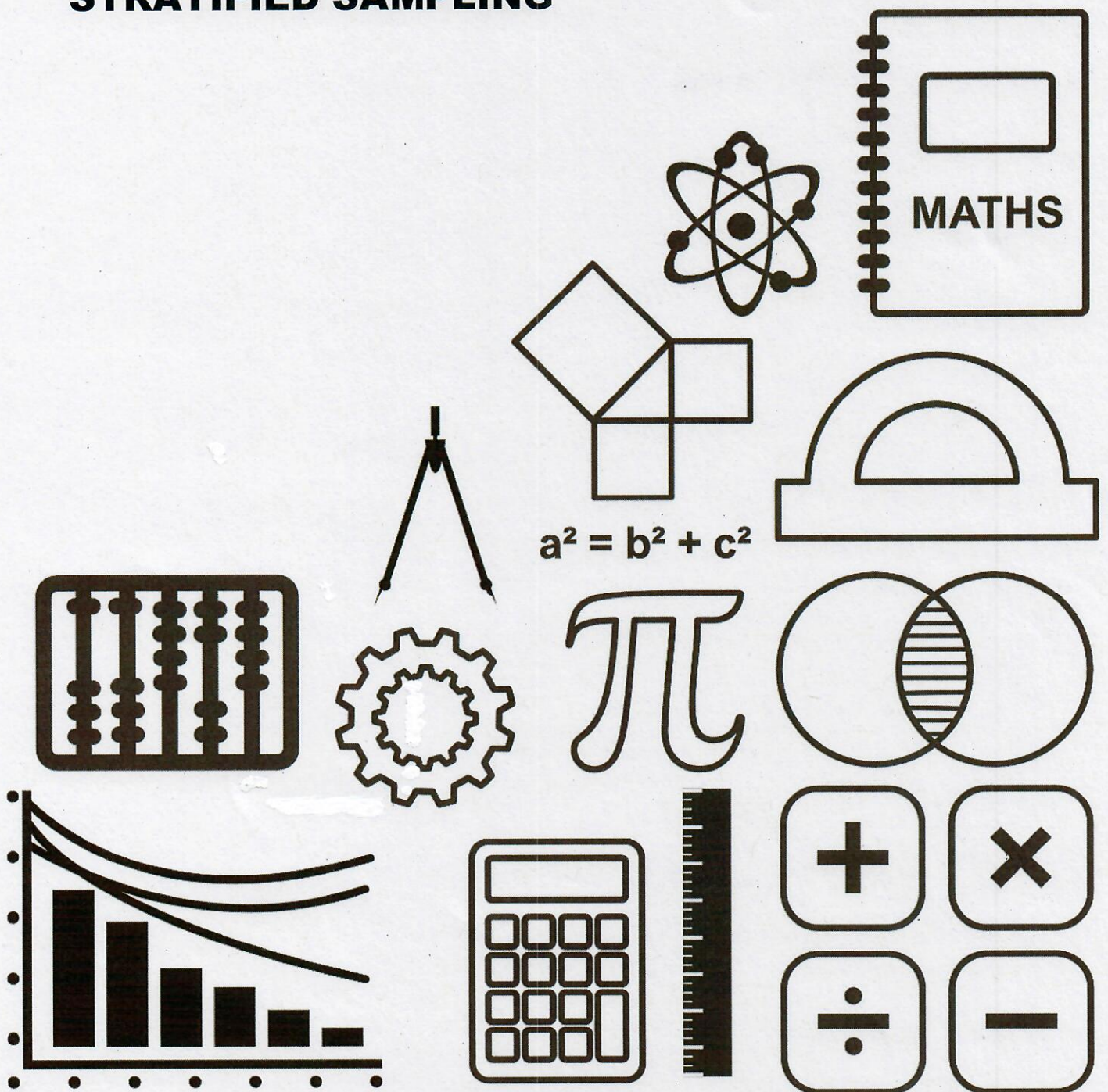


MATHSDIY

GCSE TOPIC BOOKLET STRATIFIED SAMPLING

SOLUTIONS



1. An international organisation employs people in Australia, Belgium, Canada, Denmark and Ecuador.
The number of people employed by the organisation in each country is given in the following table.

Country	Number of employees
Australia	5243
Belgium	1004
Canada	8745
Denmark	545
Ecuador	762

The organisation is arranging a charity event and decides to invite 25 employees to represent the employees in the five countries.

Use a stratified sampling method to calculate how many people from each country should be invited to the charity event.

$$\text{Total employees} = 5243 + 1004 + 8745 + 545 + 762 = 16299$$

$$\text{From Australia} = \frac{5243}{16299} \times 25 = 8.041\ldots = \underline{\underline{8}}$$

$$\text{From Belgium} = \frac{1004}{16299} \times 25 = 1.539\ldots = \underline{\underline{2}}$$

$$\text{From Canada} = \frac{8745}{16299} \times 25 = 13.413\ldots = \underline{\underline{13}}$$

$$\text{From Denmark} = \frac{545}{16299} \times 25 = 0.835\ldots = \underline{\underline{1}}$$

$$\text{From Ecuador} = \frac{762}{16299} \times 25 = 1.168\ldots = \underline{\underline{1}}$$

[4]

An international clothing manufacturer employs people in Peru, Mexico, Finland, Thailand and Vietnam.

The number of people employed by the clothing manufacturer in each country is given in the following table.

Country	Number of employees
Peru	564
Mexico	346
Finland	320
Thailand	2130
Vietnam	3450

The clothing manufacturer is arranging a fashion show and decides to invite a total of 18 employees to represent all the employees in the five countries.

Use a stratified sampling method to calculate how many people from each country should be invited to the fashion show.

$$\text{Total employees} = 564 + 346 + 320 + 2130 + 3450 = 6810$$

$$\text{From Peru} = \frac{564}{6810} \times 18 = 1.49 \dots = 1$$

$$\text{From Mexico} = \frac{346}{6810} \times 18 = 0.91 \dots = 1$$

$$\text{From Finland} = \frac{320}{6810} \times 18 = 0.84 \dots = 1$$

$$\text{From Vietnam} = \frac{3450}{6810} \times 18 = 9.11 \dots = 9$$

[4]

$$\text{From Thailand} = \frac{2130}{6810} \times 18 = 5.62 \dots = 6$$

3.

A European supermarket employs people from a number of countries. The number of people employed by the company in each country is given in the following table.

Country	Number of employees
Germany	12355
France	8340
Spain	6860
Italy	4100
United Kingdom	3045

The company is organising a conference and decides to invite a total of 45 employees to represent the views of the entire workforce.

Use a stratified sampling method to calculate how many people from each country should be invited to the conference.

$$\text{Total employees} = 12355 + 8340 + 6860 + 4100 + 3045 = \underline{\underline{34700}}$$

$$\text{From Germany} = \frac{12355}{34700} \times 45 = 16.022... = \underline{\underline{16}}$$

$$\text{From France} = \frac{8340}{34700} \times 45 = 10.815... = \underline{\underline{11}}$$

$$\text{From Spain} = \frac{6860}{34700} \times 45 = 8.896... = \underline{\underline{9}}$$

$$\text{From Italy} = \frac{4100}{34700} \times 45 = 5.317... = \underline{\underline{5}}$$

[4]

$$\text{From UK} = \frac{3045}{34700} \times 45 = 3.948... = \underline{\underline{4}}$$

4. An international festival is to be held, but tickets are limited to 5000. It is decided that the audience should represent the demand for individual tickets from the countries involved. The number of requests for individual tickets is given in the following table.

Country	Number of requests
U.K.	43 000
Germany	28 000
France	11 000
Italy	900
Spain	200

Use a stratified sampling method to calculate how many tickets should be allocated to each country for the international festival.

$$\text{Total requests} = 43\,000 + 28\,000 + 11\,000 + 900 + 200 = 83\,100$$

$$\text{From UK} = \frac{43\,000}{83\,100} \times 5\,000 = 2587.24 \dots = 2587$$

$$\text{From Germany} = \frac{28\,000}{83\,100} \times 5\,000 = 1684.71 \dots = 1684$$

$$\text{From France} = \frac{11\,000}{83\,100} \times 5\,000 = 661.85 \dots = 662$$

$$\text{From Italy} = \frac{900}{83\,100} \times 5\,000 = 54.15 \dots = 54$$

$$\text{From Spain} = \frac{200}{83\,100} \times 5\,000 = 12.03 \dots = 12$$

[4]

5. Porth Ifan Hospital has made some changes to improve patient care. A survey is to be used to find out the views of the hospital staff.

(a) The table shows the total number of staff in each job type.

Job type	Doctor	Nurse	Management	Clerical
Number of staff	120	320	56	144

The survey is to be given to a sample of 75 staff.

Use a stratified sampling method to calculate the number of staff from each job type that should be asked to complete the survey.

You must show your working.

[4]

$$\text{Total staff} = 120 + 320 + 56 + 144 = 640$$

$$\text{Doctors} = \frac{120}{640} \times 75 = 14.0625 = 14$$

$$\text{Nurses} = \frac{320}{640} \times 75 = 37.5 = 38$$

$$\text{Management} = \frac{56}{640} \times 75 = 6.5625 = 7$$

$$\text{Clerical} = \frac{144}{640} \times 75 = 16.875 = 17$$

76

one too many

So round the nurses down

to 37

Job type	Doctor	Nurse	Management	Clerical
Number in sample	14	37	7	17

6. Circle TRUE or FALSE for each of the following statements.

[2]

Selecting the first name on each class register will give a random sample.	TRUE	FALSE
The ratio of boys to girls in a school is 2 : 3. The pupil committee of 30 pupils is selected using a gender stratified sample. There are 10 boys and 20 girls on the school committee.	TRUE	FALSE
A telephone survey is carried out to find which political party people support. The sample of people surveyed is not a random sample of the whole population.	TRUE	FALSE
A stratified sample always considers proportions according to given criteria.	TRUE	FALSE
A random sample of people means everyone has an equal chance of being selected.	TRUE	FALSE