

GCSE Maths – Statistics

Populations

Notes

WORKSHEET



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Populations

The population of a study is **all the people or items that can be considered** in the study. In a survey to find out 200 peoples' favourite sport, the population is the 200 people. In a study to find the most common letters in town names in Britain, the population is every town in Britain.

Applying Statistics to a Population

Statistics can be used to describe a population and the trends within it. The most common statistics to apply to a population are **mean, median** and **mode**.

They are measures of central tendency that describe how close data points are to the central point of a set. More information on measures of central tendency can be found in:

- *Maths GCSE Revision Resources – Statistics – Measures of Central Tendency*

Describing a Population

A population can be **divided into groups** with similar characteristics to identify patterns and trends. This allows us to describe the population by describing trends and patterns.

A survey is carried out at a football game to find out how many of the spectators play a sport themselves. The following information is collected:

- There are **250 women** at the game.
- There are **750 men** at the game.

We can use this information to say that 250 out of the $250 + 750 = 1000$ people at the game are women. Therefore, $\frac{250}{1000} = \frac{1}{4}$ of the population are female.

Information is also collected about the sports that people play:

- **100 of the women** at the game are part of a football club.
- **500 of the men** at the game are part of a football club.

We can use this information to calculate that $\frac{500}{750} = \frac{2}{3}$ of the men in the population are part of a football club. Furthermore, $500 + 100 = 600$ of the people at the game are part of a football club, or $\frac{600}{1000} = \frac{3}{5}$ of the population. This information can be displayed in a table:

	Play football	Don't play football	Total
Men	500	250	750
Women	100	150	250
Total	600	400	1000



Example: Some information is collected from members of a gardening club.

- There are 65 men at the club.
- There are 85 women at the club.
- 15 of the women are under 18 years old.
- 20 of the men are under 18 years old.

Complete the statements to describe the population:

- _____ % of the club's population are male.
- _____ % of the female population are over 18.
- _____ % of the club's population are under 18.

- a) Work out the **total number of people** in the club.

$$65 + 85 = 150 \text{ people}$$

Use this value to **calculate a percentage**. There are 65 men out of 150 members.

$$\% = \frac{65}{150} \times 100 = \mathbf{43.3\%}$$
 of the population are male

- b) There are 15 women who are under 18 and the remainder are over 18. Use this to **calculate the number of women who are over 18**.

$$85 - 15 = 70 \text{ women who are over 18}$$

Calculate the percentage. There are 70 women who are over 18 out of 80 women total, so:

$$\% = \frac{70}{80} \times 100 = \mathbf{87.5\%}$$
 of the female population are over 18 years old

- c) Work out the total number of under 18 members.

$$15 \text{ females} + 20 \text{ males} = 35 \text{ under 18 members.}$$

Calculate the percentage. There are 35 under 18 members out of 150 club members.

$$\% = \frac{35}{150} \times 100 = \mathbf{23.3\%}$$
 of the club population are under 18 years old



Populations - Practice Questions

1. The following data was taken from a large sample of students at a school. Make three observations about the population.

	% of Sample	Mean Math Score	Range of Math Scores
Male	54%	62.1	23.2
Female	46%	57.3	29.6

2. 5000 people attended a football match. A sample of 50 people took part in a survey after the game. Some information about their answers is shown below.

	No. in Sample	Correctly Predicted Score	Supported the Home Team
Male	38	7	32
Female	12	9	5

- a) What is the population?
- b) Estimate the number of men in the population.
- c) Estimate the number of women who supported the home team.
- d) Estimate the number of people at the match who did not correctly predict the score.

Worked solutions for the practice questions can be found amongst the worked solutions for the corresponding worksheet file.

