

GCSE Maths – Statistics

Populations

Worksheet

WORKED SOLUTIONS

This worksheet will show you how to work out different types of questions relating to populations. Each section contains a worked example, a question with hints and then questions for you to work through on your own.

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Section A

Worked Example

500 members of a sports club took part in a study. Information about the members is shown in the table. Describe the population. [4 marks]

	% of Population	Mean Age	Range of Ages
Men	73	43.8	58
Women	27	57.3	24

Step 1: The question is worth 4 marks, so you should make 4 separate points about the population of the sports club.

These should be written in 4 different sentences to make your points clear.

Step 2: Work out the number of men and women who are members of the club.

$$73\% \text{ of } 500 = 0.73 \times 500 = 365 \text{ men}$$

$$27\% \text{ of } 500 = 0.27 \times 500 = 135 \text{ women}$$

Step 3: Deduce two other points about the population.

One point should focus on each of the other columns (mean and range) that describe the population.

Step 4: Form four full sentences using this information.

*There are 365 male members of the club.
 There are 135 female members of the club.
 The female members have a higher mean age than the male members, so are older on average.
 The male members have a greater range of ages than the female members.*

Guided Example

1000 people at a concert take part in a survey. Of those at the concert, 64% are under-18. The rest range in ages up to aged 45. Describe the population. [2 marks]

Step 1: Look at how many marks the question is worth to deduce how many points you need to make.

the question is worth 2 marks, 2 separate points about the population should be made.

Step 2: Work out the distinct groups of people at the concert.

$$\text{under } 18 = 64\% = 0.64 \times 1000 = 640 \text{ people}$$

$$\text{up to age } 45 = 1000 - 640 = 360 \text{ people}$$

Step 3: Form full sentences using this information.

- 1. There are 640 people at the concert aged under 18 who took part in the survey.*
- 2. There are 360 people at the concert aged up to 45 who took part in the survey.*



Now it's your turn!

If you get stuck, look back at the worked and guided examples.

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

The question asks for three observations. Hence, 3 points should be made. We can make 1 point from each of the columns.

1. There are more male than female from the large sample of students taken. Male is 8% higher than female.
2. The mean math score for male is higher than female which means males are able to score more in maths than female on average.
3. The females have a higher range of math scores than males with a difference of 6.4.

2. Members of a music club took part in a survey. Make two observations about the population.

	% of Sample	Mean Music Grade	Range of Music Grades
Male	32	3.4	2.2
Female	68	6.8	5.1

The question asks for two observations. Hence, 2 points should be made.

1. There are more females than males in the music club. The female population exceeds the male population by 36%.
2. The mean music grade for males is only half the value scored by the females in the music club.



3. 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?

5000 people who attended a football match

- b) What percentage of the sample is male?

$$\frac{38}{50} \times 100 = 76\%$$

- c) Estimate the number of men in the population.

$$76\% = 0.76$$

$$\text{Number of men in the population} = 0.76 \times 5000 = 3800$$

- d) Estimate the percentage of women in the population.

$$\% \text{ of women in sample} : \frac{12}{50} \times 100 = 24\% \quad \rightarrow \text{percentage in sample should be the same as in the population.}$$

- e) Estimate the number of women who supported the home team.

$$\text{Probability of women who supported the home team} = \frac{5}{12}$$

$$\text{Number of women in the population} : 0.24 \times 5000 = 1200$$

$$\text{Number of women in population - supported home team} : \frac{5}{12} \times 1200 = 500$$

- f) Out of the men in the population, what percentage correctly predicted the score?

$$\text{Probability of men in sample who correctly predicted the score} : \frac{7}{38}$$

$$\text{Number of men in population who correctly predicted the score} : \frac{7}{38} \times 3800 = 700$$

$$\text{Percentage of men in population} : \frac{700}{3800} \times 100 = 18.42\%$$

- g) Estimate the number of people at the match who did not correctly predict the score.

in sample \leftarrow Percentage who correctly predicted the score : $\frac{16}{50} \times 100 = 32\%$

$$\text{Percentage who did not correctly predict the score} : 100\% - 32\% = 68\%$$

$$\text{Number of people at the match} : 0.68 \times 5000 = 3400$$

- h) Estimate the percentage of the population that supported the home team.

(same as percentage in sample)

$$\text{People who supported the home team in the sample} = \frac{32 + 5}{50} = \frac{37}{50}$$

$$\text{percentage} : \frac{37}{50} \times 100 = 74\%$$

