

Exercise walk-through

# C9.2

## Interpreting statistical data

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IGCSE Mathematics

## You must be able to

- Compare distributions with an average and a spread
- Relate statistical comparisons to the data context
- Qualify claims using the size and nature of a sample

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The method

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## Method — Key knowledge: Interpreting statistical data

Read titles, axis scales, keys and units before drawing conclusions. Compare averages for typical values and ranges for spread. Give a conclusion in context, supported by figures. A small or unrepresentative sample may not describe the population. A graph showing two quantities moving together does not prove that one causes the other.

## Exercises 2.1·2.3

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**2.1** A chart shows 18 walkers and 12 cyclists. Find the total and the more common method. [2]

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**2.2** Class A has mean 64 and class B mean 71 in the same test. Compare typical performance. [2]

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**2.3** Two routes have travel-time ranges 8 min and 3 min. Which is more consistent in the recorded data? [2]

## Exercises 2.1·2.3

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**2.1** A chart shows 18 walkers and 12 cyclists. Find the total and the more common method. [2]

**2.1**

- $N = 18 + 12 = \mathbf{30}$ ; **walking** is more common.

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**2.2** Class A has mean 64 and class B mean 71 in the same test. Compare typical performance. [2]

**2.2**

- **B has the higher mean by 7 marks**, so its average performance was higher.

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**2.3** Two routes have travel-time ranges 8 min and 3 min. Which is more consistent in the recorded data? [2]

**2.3**

- **The route with range 3 min**, since its times have less spread.

## Exercise 2.4

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**2.4** A survey asks only football-club members about their favourite sport. Explain a limitation. [2]

### 3 Exam-style questions

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### 3 Exam-style questions

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**2.4**

- **The sample favours people interested in football**, so may not represent the whole school.

## Exercise 3.1 (a)

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**3.1** Apply the interpreting statistical data methods below. Show working and include units where appropriate.

(a) Shop A has daily customers 20, 30, 40; shop B has 28, 30, 32. Find both means. [2]

## Exercise 3.1 (a)

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**3.1** Apply the interpreting statistical data methods below. Show working and include units where appropriate.

(a) Shop A has daily customers 20, 30, 40; shop B has 28, 30, 32. Find both means. [2]

(a)

- $\bar{x}_A = 90/3 = \mathbf{30}$ ;  $\bar{x}_B = 90/3 = \mathbf{30}$ .

## Exercise 3.1 (b)

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**3.1** Apply the interpreting statistical data methods below. Show working and include units where appropriate.

(b) Find both ranges and compare consistency.

[2]

## Exercise 3.1 (b)

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**3.1** Apply the interpreting statistical data methods below. Show working and include units where appropriate.

(b) Find both ranges and compare consistency. [2]

(b)

- $R_A = 40 - 20 = \mathbf{20}$ ;  $R_B = 32 - 28 = \mathbf{4}$ . **B is more consistent** over these days.

## Exercise 3.1 (c)

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**3.1** Apply the interpreting statistical data methods below. Show working and include units where appropriate.

(c) Explain why these three days do not prove that one shop is always more popular. [2]

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(c) Explain why these three days do not prove that one shop is always more popular. [2]

(c)

- **Only three days were observed and other days may differ;** equal sample means do not establish an always-more-popular shop.

## Exercise 3.2 (a)

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**3.2** Five delivery times, in minutes, are A: 8, 10, 10, 10, 12 and B: 6, 8, 10, 12, 14.

(a) Find each mean and range, and compare consistency.

[3]

## Exercise 3.2 (a)

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**3.2** Five delivery times, in minutes, are A: 8, 10, 10, 10, 12 and B: 6, 8, 10, 12, 14.

(a) Find each mean and range, and compare consistency.

[3]

(a)

- Means  $\bar{t}_A = 50/5 = \mathbf{10}$  and  $\bar{t}_B = 50/5 = \mathbf{10}$  min.
- Ranges are **4 and 8 min.**
- A is more consistent in this sample, with the smaller range.

## Exercise 3.2 (b)

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**3.2** Five delivery times, in minutes, are A: 8, 10, 10, 10, 12 and B: 6, 8, 10, 12, 14.

(b) A manager says that A is always faster because its range is smaller. Use the observations to evaluate this claim and state one sampling limitation. [3]

## Exercise 3.2 (b)

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**3.2** Five delivery times, in minutes, are A: 8, 10, 10, 10, 12 and B: 6, 8, 10, 12, 14.

(b) A manager says that A is always faster because its range is smaller. Use the observations to evaluate this claim and state one sampling limitation. [3]

(b)

- B has a delivery at **6 min**, faster than A's fastest 8 min.
- Equal means and a smaller spread do not imply A is always faster.
- Five deliveries may be too few or unrepresentative of other routes/days.