

# 6.1 Sampling, averages and spread

Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

Total: 25 marks

**KEY WORDS** modal class • interquartile range

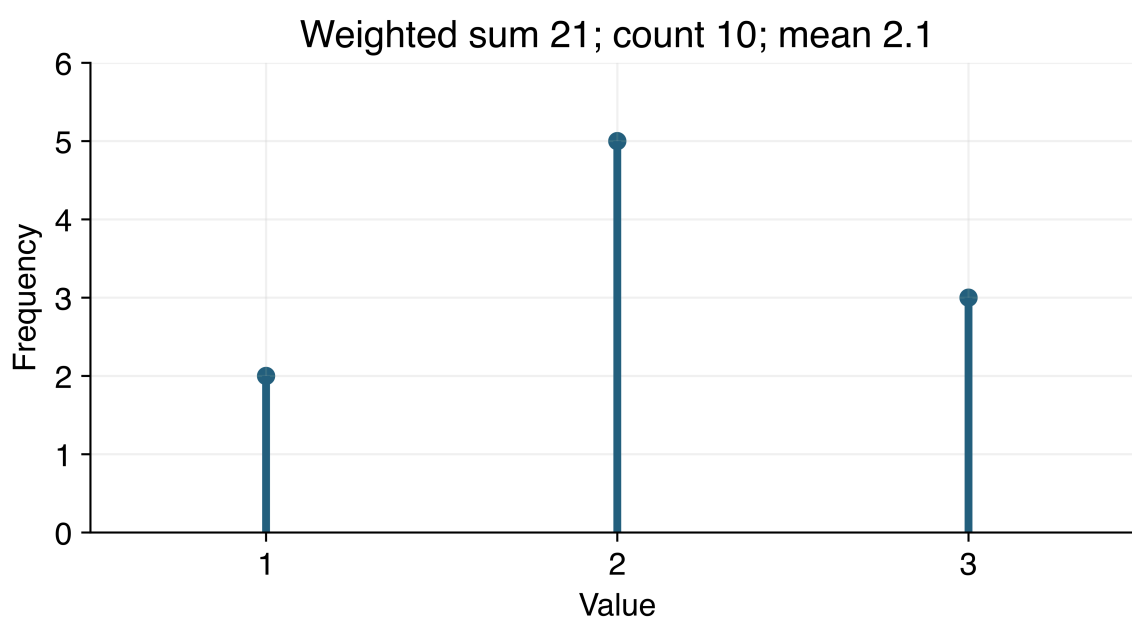
## Sampling, averages and spread

### Objective

Infer population properties from samples with their limitations, and interpret, analyse and compare distributions through means, medians, modes, modal classes, range, quartiles, inter-quartile range, outliers and box plots (rows S1, S4–S5).

### 1 Key knowledge and worked examples

**Centre and spread.** Mean =  $\frac{\sum fx}{\sum f}$  (midpoints for grouped data – an estimate); median by cumulative count; mode or modal class for the most common value. Range = max – min; inter-quartile range =  $Q_3 - Q_1$  describes the middle half. A random sample estimates a population proportion; voluntary or convenience samples carry selection bias that size alone cannot fix.



*Original native-lesson illustration; labels belong to its worked example.*

## 2 Practice

---

**2.1** Find the mean of 2, 4, 4, 6, 9. [1]

---

**2.2** Values 1, 2 and 3 have frequencies 2, 5 and 3. Find the mean and the mode. [2]

---

---

**2.3** In a random sample of 80 students, 24 walk to school. Estimate the number of walkers in a school of 600. [2]

---

---

**2.4** For the data 2, 4, 4, 6, 24, find the mean and the median, and explain why they differ. [2]

---

---

**2.5** Classify each as discrete or continuous: number of siblings; travel time to school. [2]

---

---

**2.6** Classes  $0 \leq x < 10$ ,  $10 \leq x < 20$ ,  $20 \leq x < 30$  have frequencies 2, 5, 3. Estimate the mean and write down the modal class. [3]

---

---

---

## 3 Exam-style questions

---

**3.1** (*June 2024 2H Q13, adapted.*) A table of lengths shows 15 values of 7.2, 18 values of 7.6 and 7 values of 8. Work out the mean. [3]

---

---

---

**3.2** (*June 2024 2H Q16, adapted.*) Draw a box plot for: shortest value 2.4 cm, lower quartile 4 cm, median 6 cm, upper quartile 7 cm, longest value 9 cm. [3]

---

---

---

**3.3** (*June 2024 1H Q16, adapted.*) The swimming club's median age is lower than the cycling club's, and its inter-quartile range is higher. Write two sentences comparing the clubs' ages. [2]

---

---

**3.4** (*Original, Higher.*) A cumulative-frequency graph of 80 observations reads  $Q_1 = 12$  and  $Q_3 = 21$ . State where these readings were taken on the cumulative axis, and work out the inter-quartile range. [3]

---

---

---

**3.5** (*Original.*) An optional online poll finds that 70% of 400 respondents cycle to school. Explain why this does not establish that 70% of the school cycles. [2]

---

---