

C9.4 Statistical charts and diagrams

Name: _____ Class: _____ Date: _____

Total: 20 marks

KEY WORDS stem-and-leaf diagram 茎叶图 • bar chart 条形图 • pictogram 象形图
 • frequency distribution 频数分布 • pie chart 饼图

Objective

Use statistical charts and diagrams to solve Core IGCSE Mathematics problems.

You must be able to:

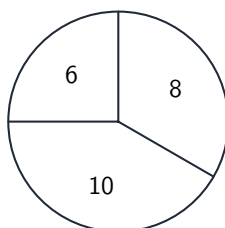
- Choose and construct appropriate statistical charts
- Calculate pie angles and interpret pictogram keys
- Include ordered stem-and-leaf entries, keys and legends

1 Key knowledge and worked examples

■ Key knowledge: Statistical charts and diagrams

Bar charts use equal-width separated bars; frequency is shown by height. A dual bar chart compares groups side by side; a stacked chart adds their components vertically. A pie-chart angle is $\theta = (f/N)360^\circ$. A pictogram key gives the amount per symbol, including half-symbols. A stem-and-leaf diagram orders leaves and includes a key showing place value. Simple frequency distributions give counts for each value.

■ Worked example: Statistical charts and diagrams



24 students; counts in sectors

Of 24 students, 6 cycle, 10 walk and 8 take a bus.

- Pie angles: $\theta_C = (6/24)360 = 90^\circ$, $\theta_W = 150^\circ$, $\theta_B = 120^\circ$; check they sum to 360.
- If each pictogram symbol means 4 students, 6 students need $s = 6/4 = 1.5$ symbols.
- Data 12, 15, 15, 21 become stem 1 with leaves 2,5,5 and stem 2 with leaf 1; key $1|2 = 12$.
- A dual bar chart puts two labelled bars per category; its legend identifies each

group.

■ **Method check**

A chart key carries numerical meaning. Pie sectors describe proportions; stem-and-leaf diagrams retain individual values and need a key.

2 Practice

2.1 A pictogram uses one symbol for 8 books. How many books do 2.5 symbols represent? [2]

2.2 A category has frequency 15 out of 60. Find its pie-chart angle. [2]

2.3 Make an ordered stem-and-leaf diagram for 23, 17, 21, 14, 17. Include a key. [2]

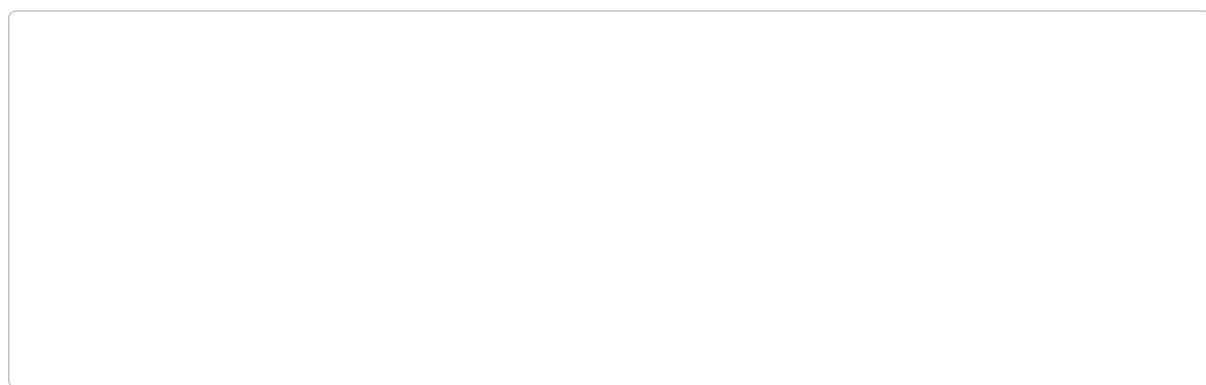
2.4 A stacked bar has 12 red and 9 blue items. State its total height if one unit represents one item. [2]

3 Exam-style questions

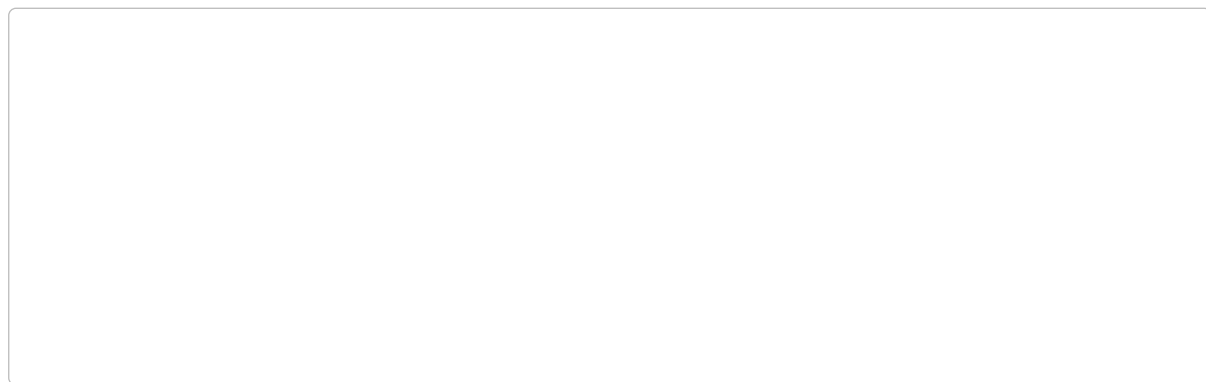
3.1 Apply the statistical charts and diagrams methods below. Show working and include units where appropriate.

(a) A survey has walk 12, cycle 8 and bus 20. Find the total and all three pie-chart angles. [2]

(b) Draw a pie chart using these angles and label its sectors. [2]



(c) A second class has walk 10, cycle 14 and bus 16. Draw a dual bar chart comparing both classes. [2]



3.2 A pictogram represents 30 walkers by 3 full symbols and three quarters of a symbol.

(a) Find the number represented by one full symbol. A bus group has 20 pupils and a cycling group has 10. Find the pie-chart angles for all three groups. [3]

(b) Journey times are 12, 17, 12, 23, 21, 17 minutes. Draw an ordered stem-and-leaf diagram with a key and read its median. [3]

Solutions

Award method and answer marks as indicated; accept equivalent correct methods.

2.1

- $N = 2.5(8) = \mathbf{20}$ books.

2.2

- $\theta = (15/60)360 = \mathbf{90^\circ}$.

2.3

- **Stem 1: leaves 4,7,7; stem 2: leaves 1,3; key $1|4 = 14$.**

2.4

- Add components: $H = 12 + 9 = \mathbf{21}$ units.

3.1

(a)

- $N = 40$; $\theta_W = 108^\circ$, $\theta_C = 72^\circ$, $\theta_B = 180^\circ$.

(b)

- **Three labelled sectors of $108^\circ, 72^\circ, 180^\circ$, drawn with a protractor.**

(c)

- **Paired bars of heights (12,10), (8,14), (20,16)** for walk, cycle, bus; equal widths, common frequency scale and a class legend.

3.2

(a)

- One symbol represents $k = 30/3.75 = \mathbf{8}$ pupils.
- Total is 60 pupils, so angles are **$180^\circ, 120^\circ, 60^\circ$** for walkers, bus, cyclists respectively.
- Their sum is 360° .

(b)

- Stem 1 has ordered leaves **2, 2, 7, 7**; stem 2 has **1, 3**.
- Key **$1 | 2 = 12$ minutes**.
- Middle values are 17 and 17, so median **17 minutes**.