

Exercise walk-through

E9.4

Statistical charts and diagrams

IGCSE Mathematics

You must be able to

- find the angle of a pie-chart slice
- describe the correlation shown by a scatter diagram
- use a line of best fit to predict

1

The method

Method — Pie charts and scatter diagrams

- **Pie chart:** slice angle = $\frac{\text{frequency}}{\text{total}} \times 360^\circ$. Tea 30 of 120 $\rightarrow \frac{30}{120} \times 360 = 90^\circ$.
- **Correlation** : **positive** (rise together), **negative** (one rises as the other falls), **zero** (no link).
- **Line of best fit** : one straight line through the middle of the points
— use it to predict.

Answer shapes: **M1** a correct method, **A1** the correct answer.

Exercises 2.1-2.3

2.1 Out of 90 people, 30 chose coffee. Find the angle of the coffee slice on a pie chart.[2]

2.2 A scatter diagram shows that as temperature rises, ice-cream sales rise. State the type of correlation. [1]

2.3 State what a **line of best fit** is used for. [1]

Exercises 2.1·2.3

2.1 Out of 90 people, 30 chose coffee. Find the angle of the coffee slice on a pie chart.[2]

2.1

$$\frac{30}{90} \times 360^\circ = \mathbf{120^\circ}$$

2.2 A scatter diagram shows that as temperature rises, ice-cream sales rise. State the type of correlation. [1]

2.2

- **positive** correlation

2.3 State what a **line of best fit** is used for. [1]

2.3

- to **predict** a value (read one variable from the other)

Exercises 3.1·3.2

3.1 In a survey of 72 people, 18 walk to work. Find the angle of the "walk" slice on a pie chart. [2]

3.2 A pie chart slice for "bus" has an angle of 120° . The total number of people is 90. Find how many travel by bus. [3]

Exercises 3.1·3.2

3.1 In a survey of 72 people, 18 walk to work. Find the angle of the "walk" slice on a pie chart. [2]

3.1

$$\frac{18}{72} \times 360^\circ = \mathbf{90^\circ}$$

3.2 A pie chart slice for "bus" has an angle of 120° . The total number of people is 90. Find how many travel by bus. [3]

3.2

$$\frac{120}{360} \times 90 = \frac{1}{3} \times 90 = \mathbf{30}$$

people

Exercise 3.3 (a)

3.3 180 students each chose one favourite subject.

Subject	Maths	Science	English	Art
Students	60	45	50	25

(a) Calculate the angle for each sector of a pie chart.

[3]

Exercise 3.3 (a)

3.3 180 students each chose one favourite subject.

Subject	Maths	Science	English	Art
Students	60	45	50	25

(a) Calculate the angle for each sector of a pie chart.

[3]

(a)

- each student is worth $\frac{360}{180} = 2^\circ$
- Maths **120°**, Science **90°**, English **100°**, Art **50°**

Exercise 3.3 (b)

3.3 180 students each chose one favourite subject.

Subject	Maths	Science	English	Art
Students	60	45	50	25

(b) A second school of 300 students draws a pie chart in which Maths has an angle of 120° . State whether more students chose Maths in the second school, showing a calculation.[3]

Exercise 3.3 (b)

3.3 180 students each chose one favourite subject.

Subject	Maths	Science	English	Art
Students	60	45	50	25

(b) A second school of 300 students draws a pie chart in which Maths has an angle of 120° . State whether more students chose Maths in the second school, showing a calculation.[3]

(b)

- 120° is $\frac{1}{3}$ of the students
- $\frac{1}{3} \times 300 = 100$ students
- that is more than 60, so **yes** – same angle, different totals

Exercise 3.3 (c)

3.3 180 students each chose one favourite subject.

Subject	Maths	Science	English	Art
Students	60	45	50	25

(c) A scatter diagram of “hours revised” against “test score” shows points rising from bottom left to top right, close to a straight line. Describe the correlation, and explain what the line of best fit is used for. [3]

Exercise 3.3 (c)

3.3 180 students each chose one favourite subject.

Subject	Maths	Science	English	Art
Students	60	45	50	25

(c) A scatter diagram of “hours revised” against “test score” shows points rising from bottom left to top right, close to a straight line. Describe the correlation, and explain what the line of best fit is used for. [3]

(c)

- strong **positive** correlation
- the line of best fit summarises the trend and lets a score be estimated

Exercise 3.3 (d)

3.3 180 students each chose one favourite subject.

Subject	Maths	Science	English	Art
Students	60	45	50	25

(d) A student uses the line of best fit to predict the score for 20 hours of revision, well beyond the plotted data. Explain why this is unreliable. [2]

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Subject	Maths	Science	English	Art
Students	60	45	50	25

(d) A student uses the line of best fit to predict the score for 20 hours of revision, well beyond the plotted data. Explain why this is unreliable. [2]

(d)

- 20 hours is outside the data range – this is **extrapolation**
- the pattern is not known to continue; scores cannot exceed 100, so the trend must flatten