Mathematics Paper 1
Short Answer Questions
Model Paper 2025

Time Allowed: 1 hour 50 minutes
Total Marks: 65

You must answer on the question paper.

You must bring a soft pencil (preferably type B or HB), a clean eraser, and a dark blue or black pen. You will also need geometrical instruments.

Calculators are not allowed.

Before attempting the paper, write your name, candidate number, centre name, and centre number clearly in the designated spaces.

Instructions for Candidates

- Answer all questions.
- Write your answer to each question in the space provided.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- You must show all necessary working clearly.
- Do not use an erasable pen or correction fluid.
- Avoid writing over any barcodes printed on the paper.

Information for Candidates

- This paper consists of a total of **65 marks**.
- The number of marks assigned for every question or its parts is indicated within brackets [ ].
- A formula sheet will be provided with this paper.

Please read all questions carefully and follow the instructions exactly to ensure your responses are properly evaluated.

1

(a) Write 9:15 pm in the 24-hour clock.

..... **[1]**

(b) Write down the reciprocal of 50.

..... **[1]**

(c) Identify the prime number from the following list: 6, 11, 15, 20.

..... **[1]**

2

(a) A fruit stall has 20 apples and 15 oranges. If a customer chooses one fruit at random, what is the probability that the chosen fruit is an apple?
Give your answer as a fraction in its simplest form

..... **[2]**

(b) The temperature in a freezer started at $-10°C$. Due to a power cut, it rose by $8°C$. After the power was restored, it dropped by $12°C$.
What was the final temperature in the freezer?

..... **[3]**

3

(a) A student states, "When you add any two even numbers, the sum is always an odd number." Is this statement correct?
Give a mathematical reason for your answer.

..... **[2]**

(b) Sarah rounded the number 7.47 to one decimal place and got 7.5.
Explain why her rounding is correct.

..... **[1]**

4

(a) What is the mathematical name for a number that can change its value in an expression or equation?

..... **[1]**

(b) Write $c \times c \times d \times d \times d$ using standard algebraic notation.

..... **[1]**

(c) Simplify the expression $9p + 4q - 3p$.

..... **[1]**

5

(a) Expand and simplify:

$$6(y - 3).$$

..... **[1]**

(b) The formula for the area of a trapezoid is $A = \frac{(a+b)\times h}{2}$. Find the value of A when a = 5, b = 7, and h = 4.

..... **[2]**

6

(a) A baker makes c cakes and d doughnuts. The number of cakes made is 5 more than twice the number of doughnuts. If the baker made 15 cakes, formulate an equation and solve it to find how many doughnuts (d) were made.

..... **[2]**

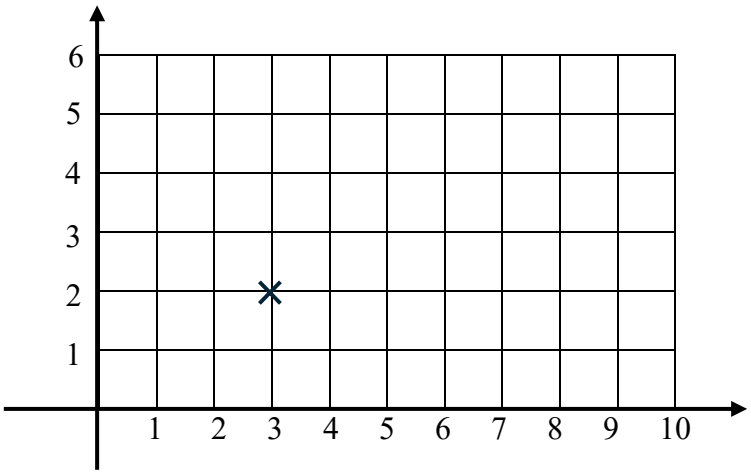
(b) Show by expansion and simplification that $(x + 5)(x - 2)$ is equivalent to

$$x^2 + 3x - 10$$

..... **[1]**

7

A point is plotted on a graph at 3 units across and 2 units up. Write down its Cartesian coordinates.



..... **[2]**

8

(a) A taxi company charges a fixed fare of £2 plus £1.50 per mile. Write down an equation that represents the total cost (C) for a journey of (m) miles.

..... **[1]**

(b) Complete the table of values for the total cost of a taxi journey using the equation from part (a).

Miles (m)	0	2	8	
Cost (C) (£)	2	5		47

..... **[2]**

9

(a) A student walks from home to a library. On a distance-time graph, the journey from home to library is represented by a straight line. What does the gradient of this line tell us about the student's walk?

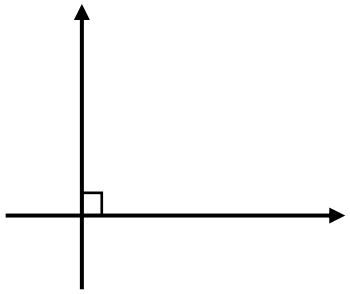
..... **[1]**

(b) Another student cycles from home to the same library. If their speed is constant, and their journey is represented on the *same* distance-time graph, what would a steeper line indicate compared to the first student's walking line?

..... **[1]**

10

(a) A right angle is shown in the diagram. What is its measure in degrees?



..... **[1]**

(b) A regular hexagon has a side length of 6 cm. Calculate its perimeter.

..... **[2]**

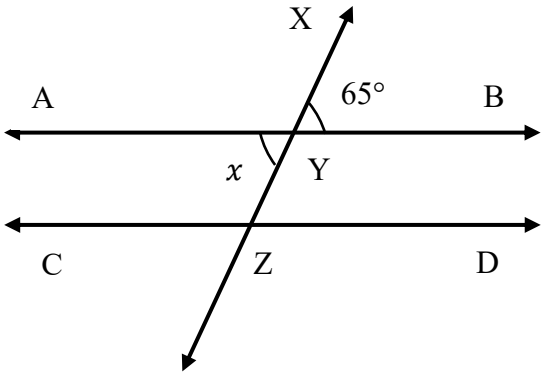
(c) Name the polygon that has 7 sides.

..... **[1]**

(d) A shape has no rotational symmetry. What is its order of rotational symmetry?

..... **[1]**

11



In the diagram above, AB is parallel CD. A transversal XZ intersects AB and CD. ∠AYX=65° and ∠BYZ = x.

(a) Find the value of x.

..... **[1]**

(b) Find the value of ∠BYZ.

..... **[2]**

12

A triangle has angles in the ratio **2:3:4**.

(a) Find the size of the **smallest angle** in the triangle.

..... **[2]**

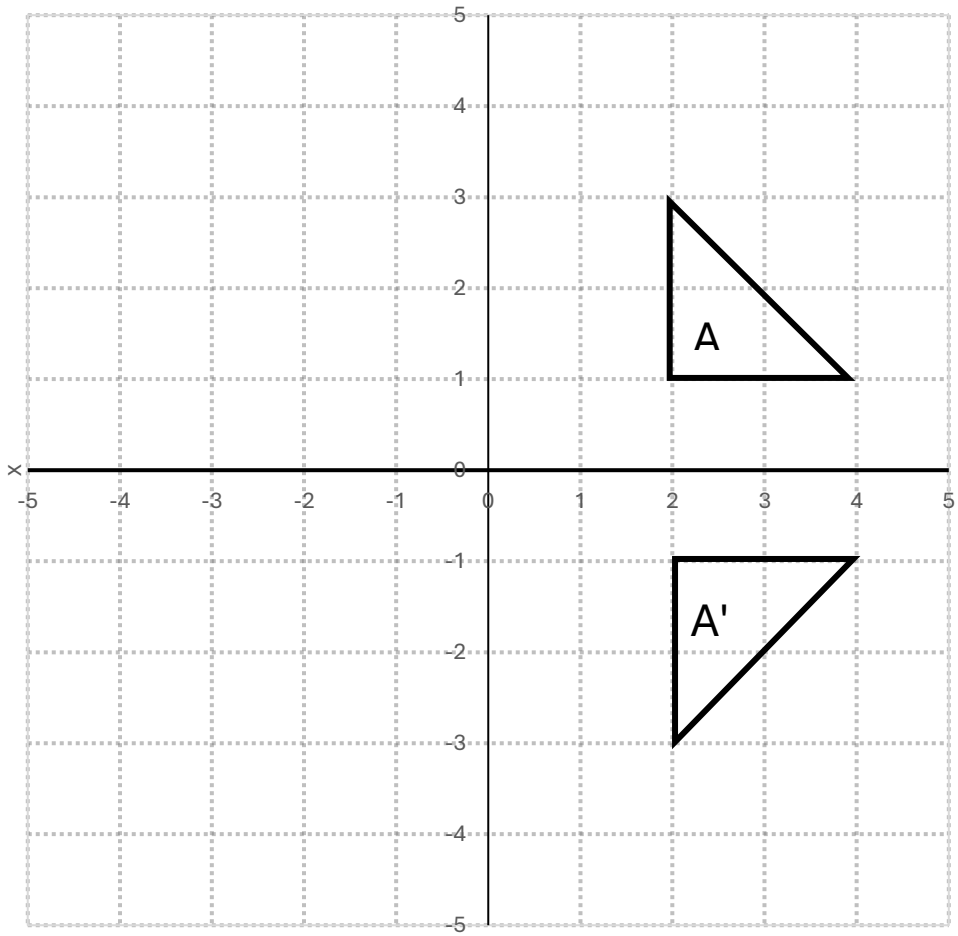
(b) Is this triangle acute, right-angled or obtuse? Why?

..... **[1]**

(c) Find the **difference** between the largest and smallest angle in the triangle.

..... **[2]**

13



(a) Describe **fully** the **single** transformation that maps triangle A onto triangle A′.

--- **[3]**

(b) One of the vertices of triangle A is at $(3,1)$. Write down the coordinates of this point after the transformation.

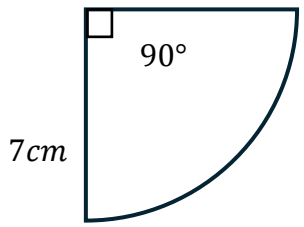
(..... , ...) [2]

14

(a) A triangle has a base of 6 cm and height of 5 cm.
Find the area of the triangle.

..... [2]

(b) A sector of a circle has a radius of 7 cm and a central angle of 90°.
Work out the length of the arc. Use $\pi = \frac{22}{7}$.



..... [2]

(c) The point A has position vector A $\begin{pmatrix} 2 \\ -1 \end{pmatrix}$ is translated by vector $\begin{pmatrix} -3 \\ 4 \end{pmatrix}$.

Find the position vector of the new point.

..... **[2]**

15

(a) A box contains 3 red, 5 green and 2 yellow balls. One ball is picked at random.

Complete the probability table below.

P (NOT Green)	P (Green OR Yellow)

..... **[2]**

(b) The mean of five numbers is 6.

Four of the numbers are: 4, 7, 5, and 8.

Find the fifth number.

..... **[2]**

16

The following list shows the number of hours 11 students revised for an exam:

$$2, 4, 5, 6, 9, 10, 12, 10, 4, 8, 7$$

(a) Find:

i. Lower Quartile

..... **[1]**

ii. Median

..... **[1]**

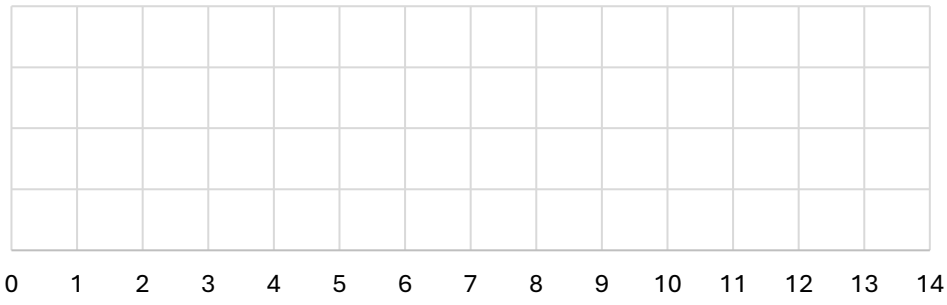
iii. Upper Quartile

..... **[1]**

(b) Find the **interquartile range (IQR)**.

..... **[1]**

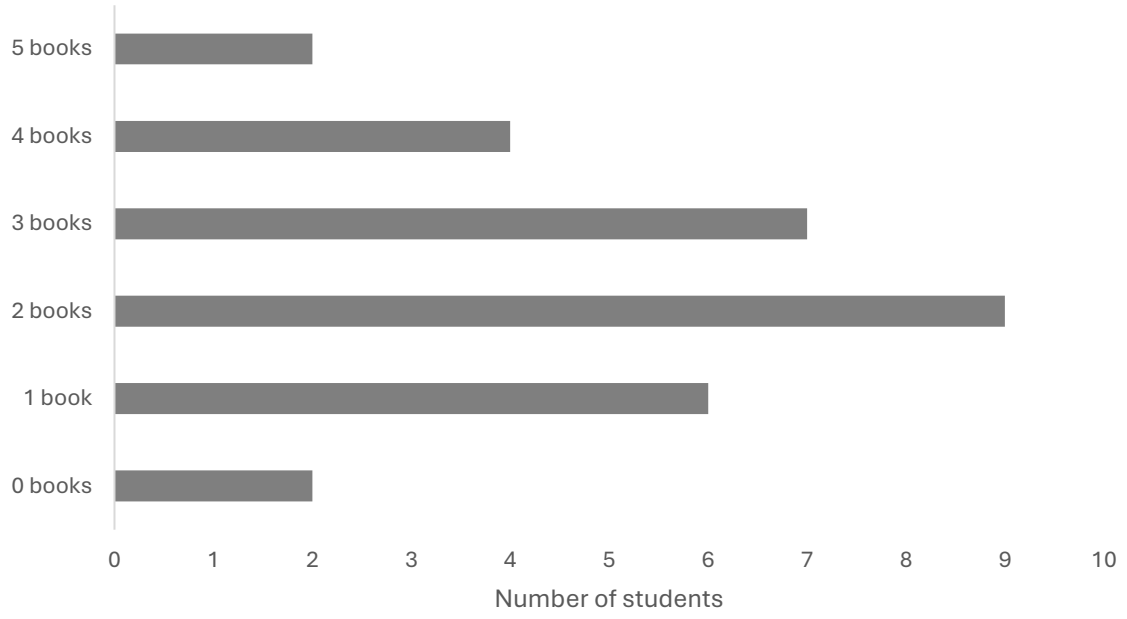
(c) Draw a **box plot** for the data using a scale from 0 to 14.



[2]

17

The bar chart shows the number of books read by students in one month.



(a) How many students read fewer than 3 books?

..... **[1]**

(b) What fraction of students read 4 or more books? Write the fraction in simplest form.

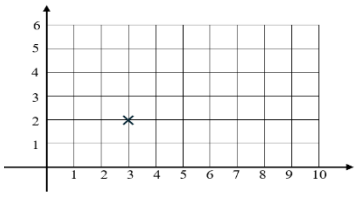
..... **[2]**

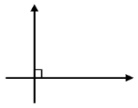
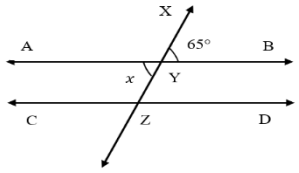
(c) A student says, "Most students read 2 books." Do you agree? Give a reason.

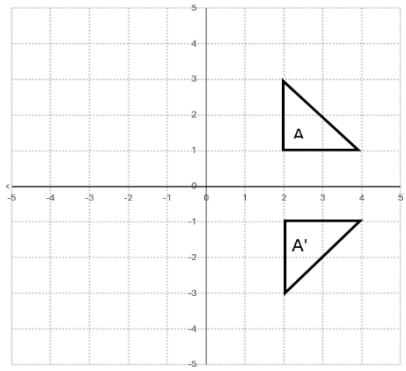
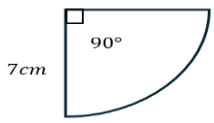
..... **[1]**

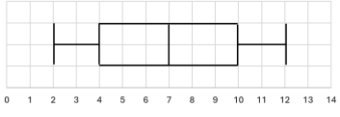
Marking Scheme

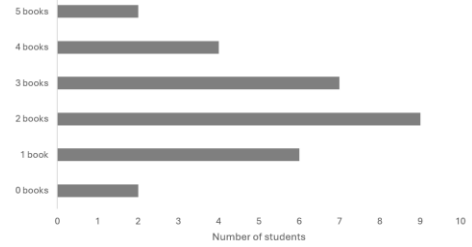
Question		Solution	Notes
Q1	(a) Write 9:15 pm in the 24-hour clock.	21:15	**B1** for 21:15
	(b) Write down the reciprocal of 50.	1/50	**B1** for 1/50.
	(c) Identify the prime number from the following list: 6, 11, 15, 20.	11	**B1** for 11
Q2	(a) A fruit stall has 20 apples and 15 oranges. If a customer chooses one fruit at random, what is the probability that the chosen fruit is an apple? Give your answer as a fraction in its simplest form.	4/7	**M1** for 20/35 or equivalent. **A1** for 4/7
	(b) The temperature in a freezer started at -10°C. Due to a power cut, it rose by 8°C. After the power was restored, it dropped by 12°C. What was the final temperature in the freezer?	-14°C	**M2** for showing a correct step in calculation (-10-8-12). **A1** for -14°C.
Q3	(a) A student states, "When you add any two even numbers, the sum is always an odd number." Is this statement correct? Give a mathematical reason for your answer.	No, because the sum of two even numbers is always an even number. For example, 2 + 4 = 6.	**B1** for stating "No" or "Incorrect" **E1** for providing a correct mathematical reason or counterexample, such as 2 + 4 = 6 explaining that an even number is integer divisible by 2, and the sum two such numbers will also be divisible by 2.
	(b) Sarah rounded the number 7.47 to one decimal place and got 7.5. Explain why her rounding is correct.	Sarah is correct because the digit in the second decimal place (7) is 5 or greater, which means the digit in the first decimal place (4) should be rounded up.	**E1** for a correct explanation.
Q4	(a) What is the mathematical name for a number that can change its value in an expression or equation?	Variable	**B1** For correctly stating 'Variable'.
	(b) Write $c \times c \times d \times d \times d$ using standard algebraic notation.	c^2d^3	**B1** For correctly writing c^2d^3.
	(c) Simplify the expression $9p + 4q - 3p$	$6p + 4q$	**B1** For correctly simplifying to $6p + 4q$.
Q5	(a) Expand and simplify: $6(y - 3)$.	$6 \times y - 6 \times 3$ $= 6y - 18$	**M1** For correctly expanding to 6y – 18.
	(b) The formula for the area of a trapezoid is $A = \frac{(a+b)\times h}{2}$. Find the value of A when a=5, b=7, and h=4.	$A = \frac{(5+7)\times 4}{2}$ $A = \frac{(12)\times 4}{2}$	**M1** For correctly substituting the values and calculating the result. **A1** for Area =24

		A = $\frac{48}{2}$ A = 24	
Q6	(a) A baker makes c cakes and d doughnuts. The number of cakes made is 5 more than twice the number of doughnuts. If the baker made 15 cakes, formulate an equation and solve it to find how many doughnuts (d) were made.	Let the number of cakes be c and doughnuts be d. The problem states: $c = 2d + 5$ Given $c = 15$, substitute this into the equation: $15 = 2d + 5$ $15 - 5 = 2d$ $10 = 2d$ $d = 5$	**M1** For correctly formulating the equation c = 2d + 5 or 15 = 2d + 5. **A1** For correctly solving the equation to find d = 5.
	(b) Show by expansion and simplification that $(x + 5)(x - 2)$ is equivalent to $x^2 + 3x - 10$	$(x + 5)(x - 2)$ $= x(x - 2) + 5(x - 2)$ $= x^2 - 2x + 5x - 10$ $= x^2 + 3x - 10$ Therefore, the expressions are equivalent.	**M1** For correctly expanding the binomial product to show $x^2 - 2x + 5x - 10$ and then simplifying to $x^2 + 3x - 10$, thus proving equivalence.
Q7	(a) A point is plotted on a graph at 3 units across and 2 units up. Write down its Cartesian coordinates.  	(3,2)	**B2** For correctly writing the coordinates as (3, 2).
Q8	(a) A taxi company charges a fixed fare of £2 plus £1.50 per mile. Write down an equation that represents the total cost (C) for a journey of (m) miles.	$C = 1.5m + 2$ (oe)	**A1** For correctly formulating the equation.
	(b) Complete the table of values for the total cost of a taxi journey using the equation from part (a). **Miles (m)** | 0 | 2 | 8 | **Cost (C) (£)** | 2 | 5 | | 47	When m=8, C=14 When C=47, m=30	**M1** for correct substitution into a linear expression **A1** for correctly completing the missing values of 14 and 30.
Q9	(a) A student walks from home to a library. On a distance-time graph, the journey from home to library is represented by a straight line. What does the gradient of this line tell us about the student's walk?	The gradient of a distance-time graph represents the speed (or velocity) of the student's walk (oe)	**B1** For stating 'speed' or 'rate of change of distance' (oe).

	(b) Another student cycles from home to the same library. If their speed is constant, and their journey is represented on the *same* distance-time graph, what would a steeper line indicate compared to the first student's walking line?	A steeper line indicates a faster speed. (oe)	**B1** For correctly interpreting a steeper line as a faster speed or higher rate of change.
Q10	(a) A right angle is shown in the diagram. What is its measure in degrees? 	90°	**B1** for 90°
	(b) A regular hexagon has a side length of 6 cm. Calculate its perimeter.	Perimeter = 6 cm × 6 sides = 36 cm	**M1** for multiplying the side length by 6 (e.g., 6 x 6) **A1** for the correct answer, 36 cm.
	(c) Name the polygon that has 7 sides.	Heptagon	**B1** for Heptagon
	(d) A shape has no rotational symmetry. What is its order of rotational symmetry?	Order 1	**B1** for Order 1
Q11	 In the diagram above, AB is parallel CD. A transversal XZ intersects AB and CD. ∠AYX=65° and ∠BYZ = x.		
	(a) Find the value of x.	x=65°	**A1** for 65°
	(b) Find the value of ∠BYZ.	115°	**M1** for using angles on a straight line **A1** for 115°
Q12	A triangle has angles in the ratio **2:3 4**		
	(a) Find the size of the **smallest angle** in the triangle.	Total parts = 2+3+4=9 Total angle in triangle =180° Each part = 180°÷9=20° Smallest angle = 2×20°=40°	**M1** for total parts = 9, find one part (20°) **A1** for 40°

	(b) Is this triangle acute, right-angled or obtuse? Why?	Largest angle = 4×20=80°, which is less than 90°, so all angles are less than 90°. Triangle is acute-angled.	**B1** for stating that all angles are less than 90° and concluding that the triangle is acute-angled.
	(c) Find the **difference** between the largest and smallest angle in the triangle.	Largest angle = 80° Smallest angle = 40° Difference = 80°−40°=40°	**M1** for **i**dentifying correct angles: 80 and 40 **A1** for 40°
Q13			
	(a) Describe **fully** the **single** transformation that maps triangle A onto triangle A′.	Reflection in the line y=0 (the x-axis).	**B1** for identifying that it is a reflection **B1** for stating correct mirror line as y=0 or "x-axis" **B1** for full and unambiguous description (must include both the type and the line)
	(b) One of the vertices of triangle A is at (3,1). Write down the coordinates of this point after the transformation.	$(3,-1)$	**M1** for applying the correct rule for reflection in x-axis: $(x,y) \rightarrow (x,-y)$ **A1** for $(3,-1)$
Q14	(a) A triangle has a base of 6 cm and height of 5 cm. Find the area of the triangle.	A = $\frac{1}{2} \times 6 \times 5 = 15\ cm^2$	**M1** for **s**ubstituting values into correct formula **A1** for 15 cm²
	(b) A sector of a circle has a radius of 7 cm and a central angle of 90°. Work out the length of the arc. Use $\pi = \frac{22}{7}$. 	Arc length = $\frac{90}{360} \times 2\pi r$ $= \frac{1}{4} \times 2 \times \frac{22}{7} \times 7$ $= \frac{1}{4} \times 44$ $= 11cm$	**M1** for substituting correctly into arc length formula **A1** for 11 cm

	(c) The point A has position vector A $\begin{pmatrix}2\\-1\end{pmatrix}$ is translated by vector $\begin{pmatrix}-3\\4\end{pmatrix}$. Find the position vector of the new point.	B= $\begin{pmatrix}2\\-1\end{pmatrix}+\begin{pmatrix}-3\\4\end{pmatrix}$ $=\begin{pmatrix}-1\\3\end{pmatrix}$.	**M1** for using addition **A1** for final vector $\begin{pmatrix}-1\\3\end{pmatrix}$.
Q15	(a) A box contains 3 red, 5 green and 2 yellow balls. One ball is picked at random. Complete the probability table below. P (NOT Green) | P (Green OR Yellow)	Total balls = 3+5+2=10 P (NOT Green) = $\frac{3+2}{10}=\frac{5}{10}$ P (Green OR Yellow) = $\frac{5+2}{10}=\frac{7}{10}$	**B1** for P (NOT Green) =$\frac{5}{10}$ or simplified $\frac{1}{2}$ **B1** for P (Green OR Yellow = $\frac{7}{10}$
	(b) The mean of five numbers is 6. Four of the numbers are: 4, 7, 5, and 8. Find the fifth number.	Total of 5 numbers = 6×5=30 Sum of known 4 numbers = 4+7+5+8=24 Fifth number = 30−24=6	**M1** for substituting using conceptual framework of Arithmetic Mean **A1** for 6
Q16	The following list shows the number of hours 11 students revised for an exam: 2, 4, 5, 6, 9, 10, 12, 10, 4, 8, 7		
	(a) Find: (i) Lower Quartile (ii) Median (iii) Upper Quartile	Ordered list: 2, 4, 4, 5, 6, 7, 8, 9, 10, 10, 12 Q1 = median of lower half: 4 Median = 7 (middle of 11 values) Q3 = median of upper half: 10	**B1** for Q1 = 4 **B1** for Median = 7 **B1** for Q3 = 10
	(b) Find the interquartile range (IQR).	IQR = Q3 − Q1 = 10−4=6	**B1** for IQR = 6
	(c) Draw a **box plot** for the data using a scale from 0 to 14.	Box plot: Minimum = 2, Q1 = 4, Median = 7, Q3 = 10, Maximum = 12 Plot box from Q1 to Q3 with median inside; whiskers from min to max. 	**B1** for accurate box: Q1–Q3 with median line **B1** for whiskers at 2 and 12; correctly scaled

Q17	The bar chart shows the number of books read by students in one month.  		
	(a) How many students read fewer than 3 books?	Students who read 0, 1, or 2 books: 2+6+9=17	**B1** for correct total
	(b) What fraction of students read 4 or more books? Write the fraction in simplest form.	Total students = 2+6+9+7+4+2=30 Students who read more than 4 books = 4+2=6 Fraction = $\frac{6}{30} = \frac{1}{5}$	**M1** for identifying correct group and total **A1** for simplified fraction $\frac{1}{5}$
	(c) A student says, "Most students read 2 books." Do you agree? Give a reason.	Agree – the highest bar is for 2 books (mode = 2)	**E1** for correct interpretation of mode or highest bar

Ziauddin Examination Board SSC (Advanced Level)

Mathematics Paper I

Table of Specifications (ToS)

No.	TOPICS	Question No. in model paper	AO	Total Marks
1	LANGUAGE OF MATHEMAT	Q1 (a,b,c)	AO1	3
		Q2 (a,b)	AO2	5
		Q3 (a,b)	AO3	3
2	ALGEBRA	Q4 (a,b,c)	AO1	3
		Q5 (a,b)	AO2	3
		Q6 (a,b)	AO3	3
3	GRAPHS	Q7	AO1	2
		Q8 (a,b)	AO2	3
		Q9 (a,b)	AO3	2
4	GEOMETRY	Q10 (a,b,c,d)	AO1	5
		Q11 (a,b)	AO2	3
		Q12 (a,b,c)	AO2	5
		Q13 (a,b)	AO3	5
5	MENSURATION AND VECTORS	Q14(a)	AO1	2
		Q14(b)	AO2	2
		Q14(c)	AO3	2
6	ROBABILITY AND STATISTIC	Q15 (a,b)	AO1	4
		Q16 (a,b,c)	AO2	6
		Q17 (a,b,c)	AO3	4
		Total		65

AO1: Knowledge & Understanding – 30%

AO2: Application – 40%

AO3: Analysis & Evaluation – 30%

AO	%	P1 Marks
AO1	30%	0.30 x 65 = 19
AO2	40%	0.40 x 65 = 27
AO3	30%	0.30 x 65 = 19
Total		65