2026

MATHEMATICS

Specimen Paper 1

Aligned to the 2026 O-Level Mathematics syllabus 4052

2 hours 15 minutes | 90 marks

Name: _____

Class: _____ Date: _____

Answer all 26 questions. Write your working and answers in the spaces provided.

An approved scientific calculator may be used. Use a ruler and geometrical instruments where needed.

Give non-exact numerical answers to 3 significant figures, and angles in degrees to 1 decimal place, unless the question states otherwise.

Show essential working. The marks for each part are shown in square brackets.

Diagrams are not drawn to scale unless stated. Use the formulae on the next page.

Question 24 requires accurate printing: check that AB measures 8 cm before starting.

This is an original practice paper based on recurring question structures. It is not an official examination paper or a forecast of exact 2026 questions.

Mathematical formulae

Compound interest

Total amount = $P(1 + r/100)^n$

Mensuration

Curved surface area of a cone = πrl

Surface area of a sphere = $4\pi r^2$

Volume of a cone = $\frac{1}{3}\pi r^2 h$

Volume of a sphere = $\frac{4}{3}\pi r^3$

Area of triangle ABC = $\frac{1}{2}ab \sin C$

Arc length = $r\theta$, where θ is in radians

Sector area = $\frac{1}{2}r^2\theta$, where θ is in radians

Trigonometry

$a/\sin A = b/\sin B = c/\sin C$

$a^2 = b^2 + c^2 - 2bc \cos A$

Statistics

Mean = $\Sigma fx / \Sigma f$

Standard deviation = $\sqrt{[\Sigma fx^2 / \Sigma f - (\Sigma fx / \Sigma f)^2]}$

1 (a) Express 756 as a product of its prime factors. [2]

(b) Find the smallest positive integer k for which 756k is a perfect cube. [1]

2 A rectangle has length 6.4 cm and width 3.8 cm, each measured correct to the nearest 0.1 cm.

(a) Find the upper bound for its area. [2]

(b) Write 0.0000728 in standard form. [1]

3 y is inversely proportional to √x. When x = 9, y = 12.

(a) Find y when x = 16. [2]

(b) State what happens to y when x is multiplied by 4. [1]

4 The price of a bicycle is increased by 8%. The new price is then reduced by 15%. The final price is $275.40.

(a) Find the original price of the bicycle. [2]

(b) Find the overall percentage change in the price. State whether it is an increase or a decrease. [1]

5 (a) Expand and simplify $(2x - 3)(x + 5)$. [2]

(b) Make x the subject of $t = (3x - 4)/5$. [1]

6 (a) Solve the compound inequality $-5 < 2 - 3x \leq 14$. [2]

(b) How many integer values of x satisfy this inequality? [1]

7 The universal set $\xi = \{1, 2, 3, \ldots, 12\}$.
A is the set of multiples of 2 in ξ. B is the set of factors of 12.

(a) List the elements of $A \cap B$. [1]

(b) List the elements of $(A \cup B)'$. [1]

(c) Find $n(A' \cap B)$. [1]

8 A stall sells shirts for \$14 each and bags for \$9 each.
The matrix M gives the numbers sold. Its rows represent Friday and Saturday, respectively, and its columns represent shirts and bags. C is the column matrix of prices.

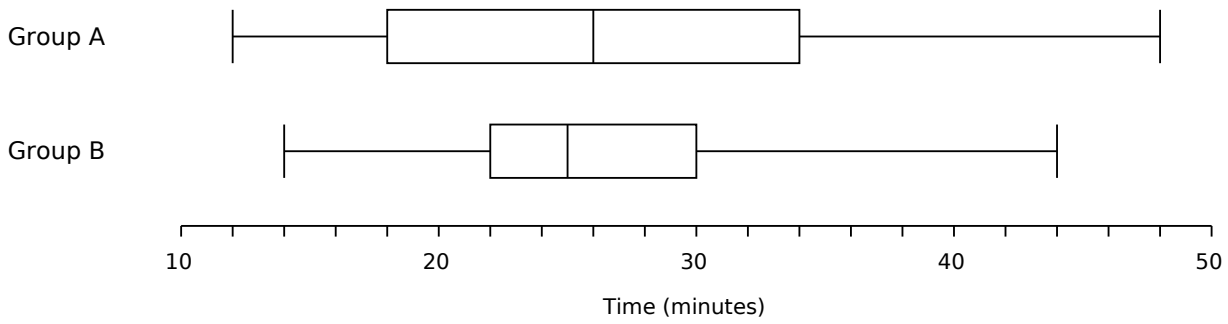
$$M = \begin{bmatrix} 18 & 12 \\ 25 & 16 \end{bmatrix} \qquad C = \begin{bmatrix} 14 \\ 9 \end{bmatrix}$$

(a) Calculate MC. [2]

(b) State what the second entry of MC represents. [1]

(c) Find Saturday's revenue if the shirt price had been 15% higher, with all quantities and the bag price unchanged. [1]

9 The box-and-whisker plots show the times taken by two groups to complete the same puzzle.

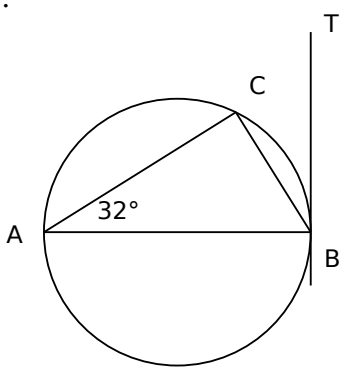


(a) Find the interquartile range for Group A. [1]

(b) Compare the typical times taken by the two groups. [1]

(c) Compare the consistency of the times, using the interquartile ranges. [1]

10 AB is a diameter of the circle. C lies on the circle. BT is a tangent at B, and angle BAC = 32°.
Give a reason with each answer.



(a) Find angle ACB. [1]

(b) Find angle ABC. [1]

(c) Find angle CBT. [1]

11 Two solid cones are geometrically similar. The ratio of their heights, smaller : larger, is 2 : 3.

(a) The total surface area of the smaller cone is 96 cm². Find the total surface area of the larger cone. [2]

(b) The volume of the larger cone is 145.8 cm³. Find the volume of the smaller cone. [1]

12 A is the point (−2, 5) and B is the point (4, −1).

(a) Find the gradient of AB. [1]

(b) Find the equation of the perpendicular bisector of AB. [2]

13 (a) Factorise $4x^2 - 25$. [1]

(b) Simplify $(2x^2 - 5x - 3)/(4x^2 - 1)$. [2]

(c) State the two values of x for which the original expression in part (b) is undefined. [1]

14 (a) Express $x^2 - 6x + 11$ in the form $(x - a)^2 + b$. [2]

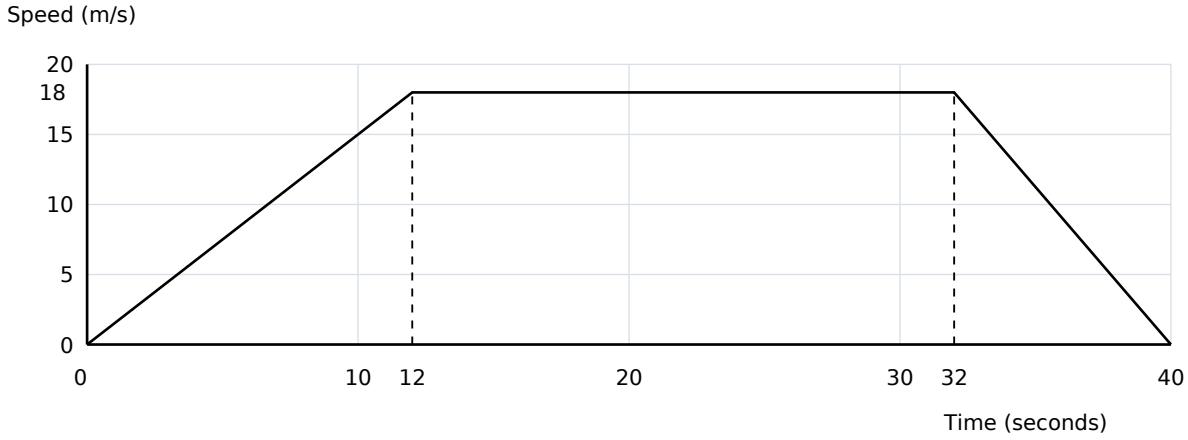
(b) Write down the coordinates of the minimum point of $y = x^2 - 6x + 11$. [1]

15 A deposit of $2500 earns compound interest at 3.2% per annum. No money is added or withdrawn.

(a) Calculate the interest earned in 4 years. Give your answer to the nearest cent. [2]

(b) Explain why the interest earned in the fourth year exceeds the interest earned in the first year. [1]

16 The speed-time graph represents a cyclist's journey.



(a) Find the acceleration in the first 12 seconds. [1]

(b) Find the total distance travelled in the 40 seconds. [2]

17 The first four terms of a quadratic sequence are 5, 11, 19, 29.

(a) Find the fifth term. [1]

(b) Find an expression for the nth term. [2]

18 Each interior angle of a regular polygon is 150°.

(a) Find the number of sides of the polygon. [2]

(b) At one vertex, the polygon and a square occupy adjacent, non-overlapping angles. Find the angle remaining around that point. [1]

19 Two boats leave a harbour O. Boat A travels 8 km on a bearing of 070°. Boat B travels 11 km on a bearing of 140°.

(a) Find the distance between the boats. [3]

(b) Find the bearing of O from A. [1]

20 A sector of a circle has radius 12 cm and angle 1.4 radians.

(a) Calculate its area. [2]

(b) Calculate its perimeter. [2]

21 A is the point (2, −1) and B is the point (8, 7). P lies on AB such that AP : PB = 1 : 3.

(a) Find the magnitude of vector AB. [2]

(b) Find the coordinates of P. [2]

22 A bag contains 5 red, 3 blue and 2 green counters. Two counters are taken at random without replacement.

(a) Find the probability that both counters have the same colour. [2]

(b) Find the probability that exactly one counter is green. [2]

23 The table shows the scores of 20 students in a short quiz.

Score	0	1	2	3	4
Frequency	2	6	8	3	1

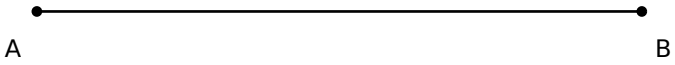
(a) Calculate the mean and the standard deviation of the scores. [2]

(b) Each student receives 2 bonus points. State the new mean and the new standard deviation. [2]

24 The line AB below is 8 cm long. Use a ruler and a pair of compasses. Leave your construction arcs visible.

(a) Construct the perpendicular bisector of AB. [2]

(b) Mark the point P above AB which is equidistant from A and B and is 5 cm from A. [1]



25 Solve $5/(x - 1) - 2/(x + 2) = 1$. Give your solutions correct to 2 decimal places. [5]

26 The graph of $y = x^3 - 4x$ is drawn below for $-2.5 \leq x \leq 3$.

(a) On the same axes, draw the line $y = x + 2$. [2]

(b) Use the graphs to solve $x^3 - 5x - 2 = 0$. [2]

(c) Use the graphs to solve $x^3 - 5x - 2 \geq 0$ for $-2.5 \leq x \leq 3$. [2]

