2026

MATHEMATICS

Claude Specimen Paper 1

Paper 1 · 2 hours 15 minutes · **90 marks**

Name: _____

Class: _____ Date: _____

- Answer **all** questions. There are 26 questions.
- Write your answers and working in the spaces provided. Omission of essential working will result in loss of marks.
- An approved scientific calculator may be used. Use a ruler and geometrical instruments where needed.
- If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to 3 significant figures. Give answers in degrees to 1 decimal place.
- For π, use your calculator value or 3.142, unless the question says otherwise.
- The number of marks is given in brackets [ ] at the end of each question or part question. The total for this paper is 90.
- Diagrams are **not** drawn to scale unless stated. Relevant formulae are on the next page.

This is an original practice paper written to the 2026 O-Level Mathematics (4052) format. It is not an official examination paper and does not forecast exact questions.

Mathematical Formulae

Compound interest

Total amount = $P\left(1+\frac{r}{100}\right)^{n}$

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

$$\frac{a}{\sin A}=\frac{b}{\sin B}=\frac{c}{\sin C}$$

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

Statistics

Mean = $\frac{\sum fx}{\sum f}$

Standard deviation = $\sqrt{\frac{\sum fx^{2}}{\sum f}-\left(\frac{\sum fx}{\sum f}\right)^{2}}$

1 Calculate $\frac{3.65 \times 10^5 - 4.8 \times 10^4}{\sqrt{2.7 \times 10^{-3}}}$,
giving your answer in standard form, correct to 3 significant figures.

Answer ..... [2]

2 Tea, milk and syrup are mixed in the ratio 7 : 4 : 1 to make a batch of bubble tea.

(a) A batch contains 360 mL more tea than milk.
Find the total volume of the batch, in litres.

Answer ..... litres [2]

(b) On a map with scale 1 : 25 000, a park has an area of 18.4 cm^2.
Find the actual area of the park, in km^2.

Answer ..... km^2 [2]

3 A badminton racket is sold at a sale. The sale price is 15% less than the marked price. GST of 9% is then added to the sale price.
Mr Tan pays $111.18 for the racket.
Find the marked price of the racket.

Answer $ ..... [3]

4 (a) Rui En deposits $10 000 in a bank account that pays compound interest at a rate of *r*% per year, compounded yearly.
After 3 years, the amount in the account is $10 768.91.
Find the value of *r*.

r = ... [3]

(b) A tourist exchanges S$600 for yen at a rate of S$1 = ¥112.40.
He spends ¥55 000 in Tokyo. He changes the remaining yen back to Singapore dollars at a rate of S$1 = ¥118.00.
Calculate, correct to the nearest cent, the amount he receives in Singapore dollars.

Answer S$ ..... [2]

5 Expand and simplify $(2x-3)^2 - (x+4)(x-5)$.

Answer ..... [2]

6 (a) Factorise completely $3ax - 6ay + bx - 2by$.

Answer ..... [1]

(b) Factorise $6x^2 + x - 15$.

Answer ..... [2]

7 Simplify $\frac{6x^2 - x - 2}{4x^2 - 1}$ completely.

Answer ..... [3]

8 $p = \sqrt{\frac{a+3b}{b}}$

Make b the subject of the formula, assuming $p^2 \neq 3$.

$b =$ ..... [3]

9 Solve $\frac{4}{x+1} + \frac{3}{x-2} = 2$.

Give your answers correct to 2 decimal places.

$x =$ .....

or $x =$ ..... [3]

10 At a hawker centre, 2 bowls of fishball noodles and 3 glasses of barley drink cost \$12.70. 3 bowls of the same noodles and 2 glasses of the same barley drink cost \$14.80.

(a) Let a bowl of noodles cost \$$x$ and a glass of barley drink cost \$$y$.
Write down two equations in x and y.

[1]

(b) Solve the equations to find the cost of a bowl of noodles and the cost of a glass of barley drink.

Noodles: \$ .....

Barley drink: \$ ..... [3]

11 (a) Find the value of $\left(\frac{27}{64}\right)^{-\frac{2}{3}}$, giving your answer as a fraction in its simplest form.

Answer ..... [1]

(b) Solve $8^{x-1} = \frac{1}{32}$.

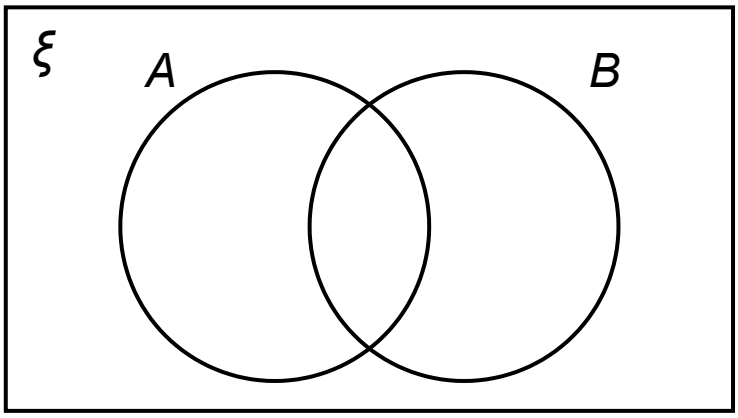
$x =$ ..... [2]

12 ξ = {integers x : $1 \leq x \leq 20$}
A = {multiples of 3}
B = {factors of 36}

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

Answer ..... [1]

(b) On the Venn diagram below, shade the set $A' \cap B$.



[1]

(c) Find $n\left(\left(A \cup B\right)'\right)$.

Answer ..... [1]

13 A school canteen sells two dishes, chicken rice and nasi lemak. The matrix $M = \begin{pmatrix} 48 & 32 \\ 36 & 45 \end{pmatrix}$ shows the number of plates sold on Monday (first row) and on Tuesday (second row). The first column is for chicken rice and the second column is for nasi lemak.

The matrix $Q = \begin{pmatrix} 3.50 \\ 4.20 \end{pmatrix}$ shows the price, in dollars, of one plate of each dish.

(a) Evaluate MQ.

$MQ =$ ..... [2]

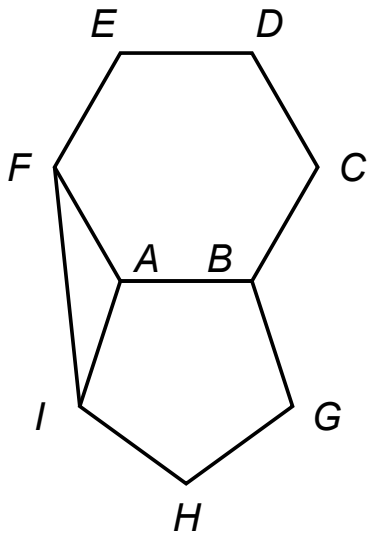
(b) State what the second element of MQ represents.

[1]

(c) Evaluate $\begin{pmatrix} 1 & 1 \end{pmatrix} M$.

Answer ..... [1]

14 The diagram shows a regular hexagon *ABCDEF* and a regular pentagon *ABGHI*. They have a common side *AB*. The line *FI* is drawn.



(a) Write down the size of one exterior angle of the regular pentagon.

Answer ..... ° [1]

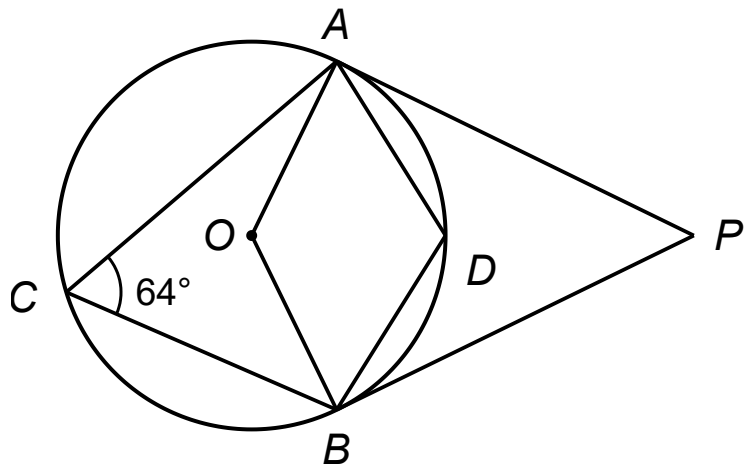
(b) Find angle *FAI*.

Angle *FAI* = ... ° [1]

(c) Find angle *AFI*.

Angle *AFI* = ... ° [1]

15 In the diagram, A, B, C and D are points on a circle with centre O. PA and PB are tangents to the circle at A and B respectively. Angle $ACB = 64°$.



(a) Find angle AOB, giving a reason.

Angle AOB = ... °

Reason ..... [1]

(b) Find angle APB, giving a reason for each step of your working.

Angle APB = ... ° [2]

(c) Find angle ADB, giving a reason.

Angle ADB = ... °

Reason ..... [1]

16 Two paper cups, *A* and *B*, are mathematically similar. Cup *A* has height 8 cm and holds 175 mℓ of bubble tea when full. Cup *B* has height 12 cm.

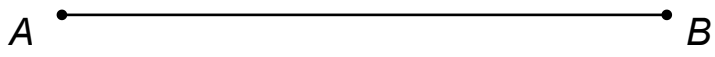
(a) Find the capacity of cup *B*.

Answer ..... mℓ [2]

(b) The area of paper used to make cup *B* is 315 cm^2. Find the area of paper used to make cup *A*.

Answer ..... cm^2 [1]

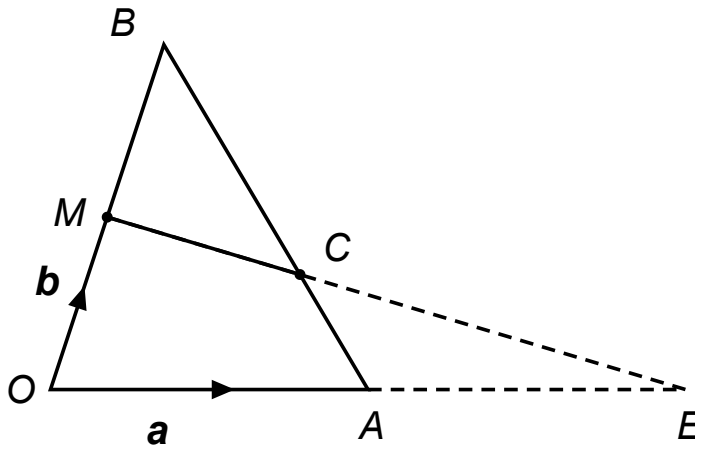
17 The line *AB* is drawn below. It is drawn to its true length of 8.0 cm.



(a) Construct triangle *ABC* in which *AC* = 6.5 cm and *BC* = 5.0 cm, with *C* above the line *AB*. Leave in all your construction arcs. [2]

(b) Using a ruler and compasses only, construct the perpendicular bisector of *AB*. Shade the region inside triangle *ABC* that is nearer to *B* than to *A*. Leave in all your construction arcs. [1]

18 In the diagram, $\overrightarrow{OA} = \boldsymbol{a}$ and $\overrightarrow{OB} = \boldsymbol{b}$. The point *C* lies on *AB* such that *AC* : *CB* = 1 : 2. The point *M* is the midpoint of *OB*. The point *E* lies on *OA* produced such that *A* is the midpoint of *OE*.



(a) Express $\overrightarrow{AB}$ in terms of $\boldsymbol{a}$ and $\boldsymbol{b}$.

$\overrightarrow{AB} =$ ..... [1]

(b) Show that $\overrightarrow{OC} = \frac{1}{3}\left(2\boldsymbol{a} + \boldsymbol{b}\right)$.

[1]

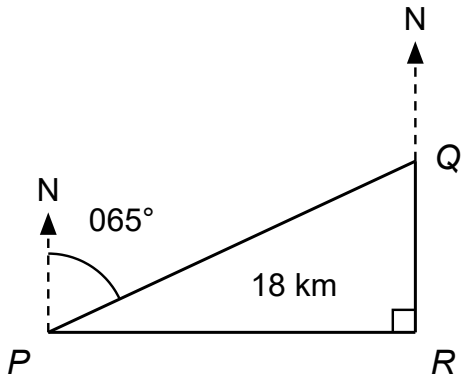
(c) Show that *M*, *C* and *E* lie on a straight line.

[2]

(d) Find the ratio of the area of triangle *OMC* to the area of triangle *OAB*.

Answer ..... : ..... [1]

19 A fishing boat sails from harbour *P* to an island *Q*. The distance *PQ* is 18 km and the bearing of *Q* from *P* is 065°. Point *R* is due east of *P* and due south of *Q*.



(a) Write down the bearing of *P* from *Q*.

Answer ..... ° [1]

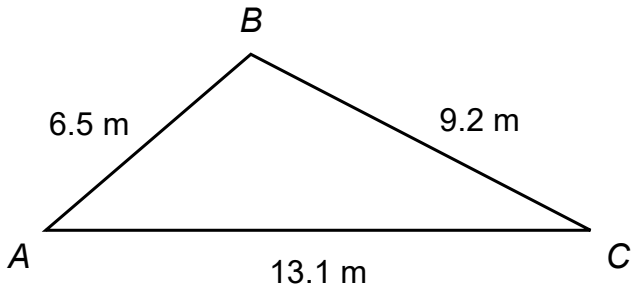
(b) Calculate the distance *PR*.

PR = ... km [2]

(c) Calculate the distance *QR*.

QR = ... km [1]

20 A triangular flower bed ABC in a park has sides AB = 6.5 m, BC = 9.2 m and AC = 13.1 m.



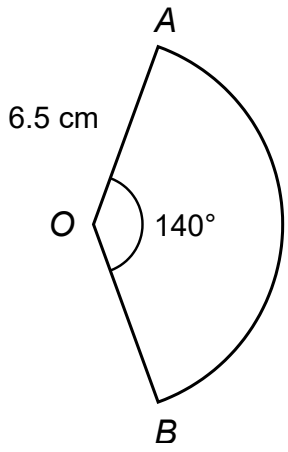
(a) Calculate angle ABC.

Angle ABC = ... ° [3]

(b) Calculate the area of the flower bed.

Area = ... m^2 [2]

21 The diagram shows a sector OAB of a circle, centre O, radius 6.5 cm. Angle $AOB = 140°$.



(a) Express 140° in radians, giving your answer in terms of π in its simplest form.

Answer ..... radians [1]

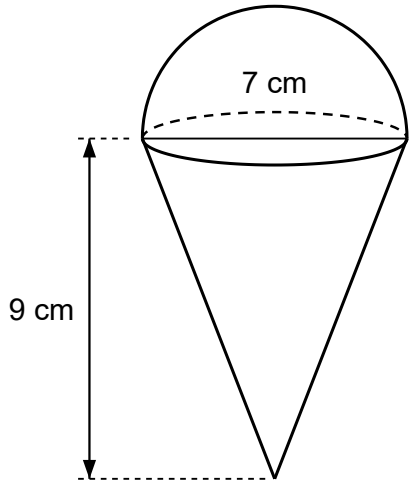
(b) Calculate the area of the sector OAB.

Answer ..... cm^2 [1]

(c) Another sector of a circle has angle 140° and arc length 22 cm. Calculate the radius of this sector.

Answer ..... cm [1]

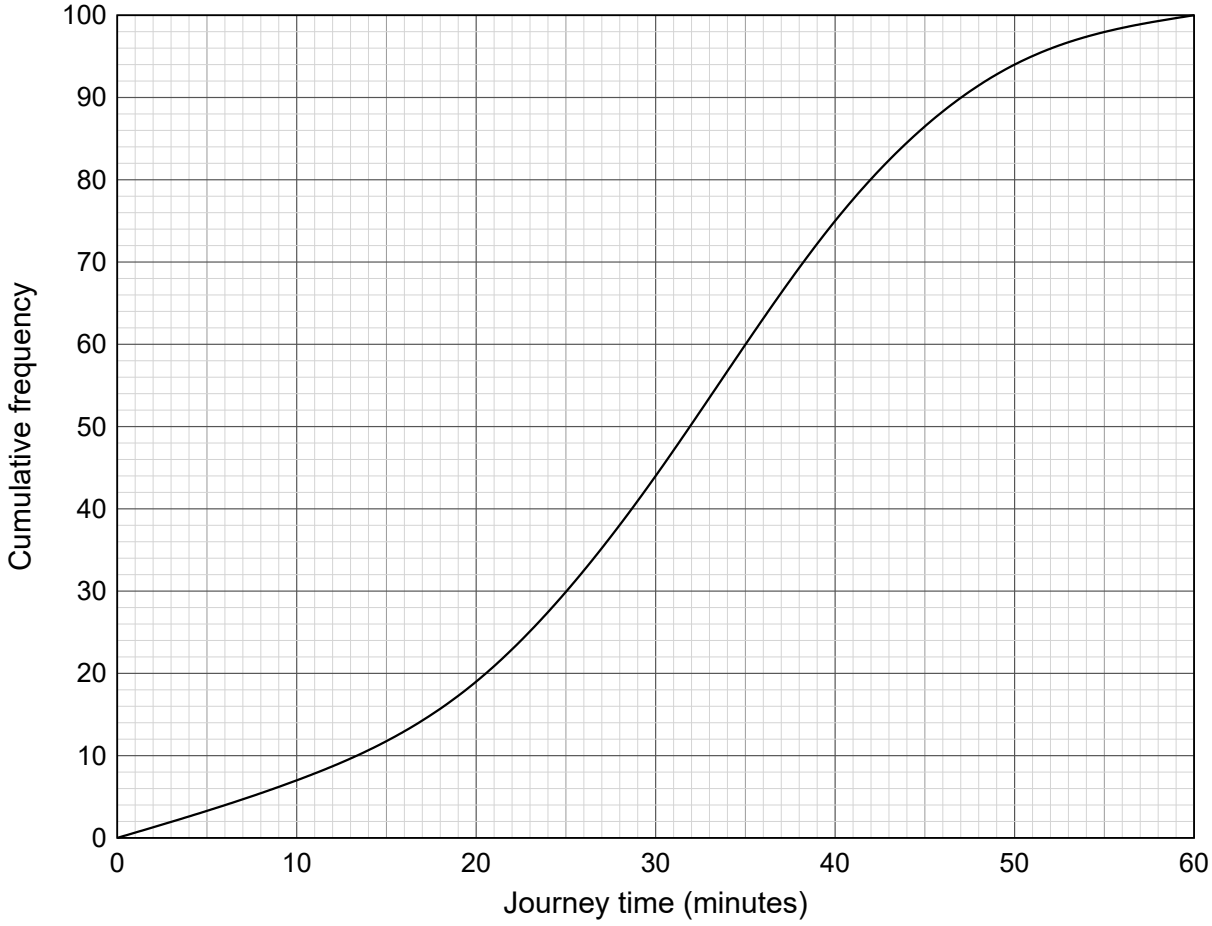
22 A scoop of ice cream in the shape of a hemisphere of diameter 7 cm sits exactly on top of a cone. The cone has base diameter 7 cm and vertical height 9 cm.



Calculate the total volume of the ice cream and cone together.

Answer ..... cm^3 [3]

23 The cumulative frequency curve shows the journey times, in minutes, of 100 students from home to school.



Use the curve to estimate

(a) the median journey time,

Answer ..... minutes [1]

(b) the interquartile range,

Answer ..... minutes [2]

(c) the number of students whose journey time is more than 35 minutes,

Answer ..... [1]

(d) the value of t such that 10% of the students have a journey time of more than t minutes.

t = ... [1]

Show your method clearly on the graph.

24 A bubble tea shop records the waiting times, in minutes, of 8 customers at its Orchard outlet.

Customer	1	2	3	4	5	6	7	8
Waiting time (minutes)	6	9	4	11	7	8	5	10

A second outlet, at Tampines, has a mean waiting time of 6.8 minutes and a standard deviation of 3.6 minutes.

(a) Calculate the mean waiting time at the Orchard outlet.

Answer ..... minutes [1]

(b) Calculate the standard deviation of the waiting times at the Orchard outlet.

Answer ..... minutes [1]

(c) Compare the waiting times at the two outlets. Make two comments in the context of the question.

[2]

25 At a school carnival, 25 lucky-draw tickets numbered 1 to 25 are placed in a box. A ticket is drawn at random, its number is noted and it is then put back in the box. A second ticket is then drawn at random.

(a) Find the probability that the first ticket drawn is a square number.

Answer ..... [1]

(b) Find the probability that the first ticket is a square number and the second ticket is an even number.

Answer ..... [1]

26 The equation of a curve is $y = x^2 + 6x + 1$.

(a) Express y in the form $y = (x + p)^2 + q$, where p and q are integers.

$y =$ ..... [2]

(b) Write down the coordinates of the turning point of the curve.

Answer ..... [1]

(c) Write down the equation of the line of symmetry of the curve.

Answer ..... [1]