Kingdom of Lesotho
Ministry of Education and Training

EXAMINATIONS COUNCIL OF LESOTHO
Lesotho General Certificate of Secondary Education

CANDIDATE NAME			
CENTRE NUMBER		CANDIDATE NUMBER	

MATHEMATICS
Paper 3 (Core)

0178/03
May/June 2025
2 hours
Marks: 100

Candidates answer on the Question Paper.

Additional Materials: Electronic calculator
Geometrical instruments
Tracing paper (optional)

READ THESE INSTRUCTIONS FIRST

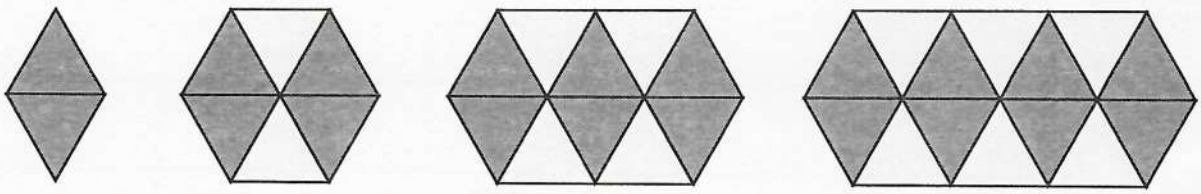
Write your name, centre number and candidate number in the relevant spaces provided at the top of this page.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.

Answer **all** questions.
Electronic calculators should be used.
If working is needed for any question, it must be shown below that question.
If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.
For π, use either your calculator value or 3.142.

The number of marks is given in brackets [ ] at the end of each question or part question.

This document consists of **16** printed pages.

1 The diagram shows a sequence of patterns made of shaded and unshaded triangles.



Pattern 1 Pattern 2 Pattern 3 Pattern 4

(a) Complete the table.

Pattern number	1	2	3	4
Number of shaded triangles	2	4	.....	.....
Number of unshaded triangles	0	2	4	6
Total number of triangles	2	6	10	.....

[2]

(b) Find

(i) the number of unshaded triangles in pattern 6,

..... [1]

(ii) the nth term, for the total number of triangles in pattern n.

..... [2]

2 $h(x) = 2x - 5$ and $g(x) = x^2 + 1$.

(a) Find $g(-6)$.

.....[1]

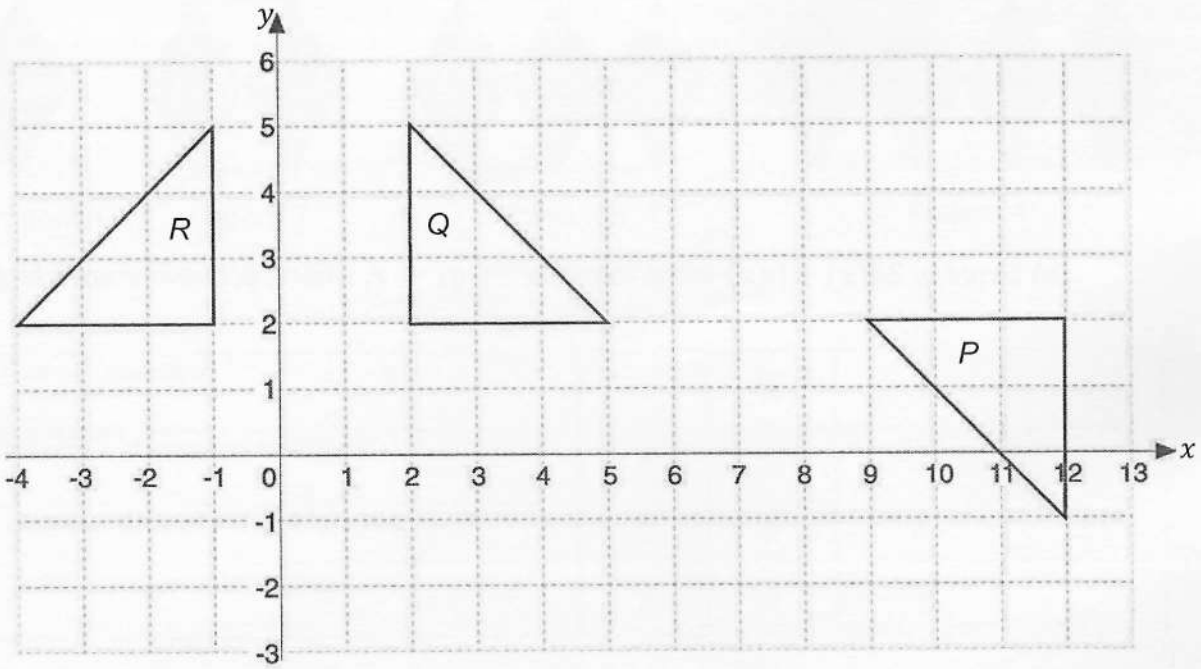
(b) Express $2g(x) - h(x)$ in the form $px^2 + qx + r$, where, p, q and r are integers.

..... [3]

(c) Find the value of x for which $xh(x) - 2g(x) = -12$.

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

3 The diagram shows triangles P, Q and R.



(a) R is mapped onto Q by reflection.

State the equation of the mirror line.

.....[1]

(b) Describe fully a single transformation that maps P onto Q.

.....

..... [3]

(c) On the grid, draw the image of Q after enlargement, center (0,0), scale factor $\frac{1}{2}$. [2]

(d) Calculate the area of triangle P.

.....units^2[2]

4 **(a)** The table represents the number of pairs of shoe sizes in a shop.

shoe size	3	4	5	6	7	8
frequency	10	12	16	6	4	2

(i) Find the total number of pairs of shoes in the shop.

..... [1]

(ii) State the mode of the distribution.

..... [1]

(iii) Determine the range of the distribution.

.....[1]

(iv) A pair of shoes is randomly chosen from the shop.

Find the probability that at least size 6 is chosen.

.....[2]

(b) Another distribution represents the masses, in kilograms, of bags of maize.

142, 140, 130, 150, 160, 136, 158,132, 128, 130

Find the median of the distribution.

.....[2]

(c) The report shows the marks obtained by Liau Tau in the fourth term.

SCHOOL REPORT

term : FOUR YEAR: 2022

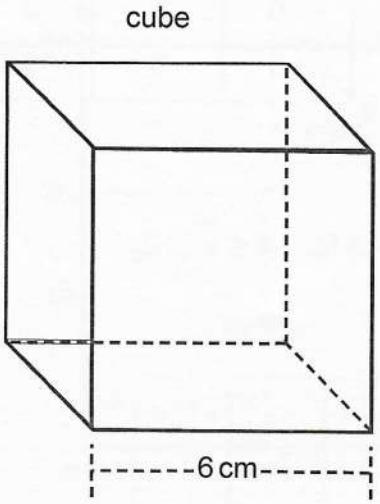
NAMES: LIAU TAU GRADE: TEN

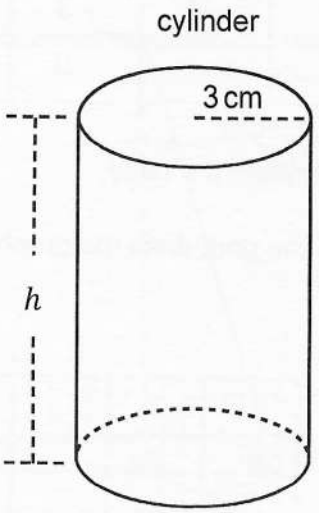
SUBJECT	MARKS
SESOTHO	78
ENGLISH	59
PHYSICAL SCIENCE	64
BUSINESS STUDIES	47
MATHEMATICS	--

Calculate the marks that Liau Tau should obtain in Mathematics so that the average mark is 65.

.....[3]

5 The diagram shows a solid cube and a solid cylinder.
The volume of the cube is equal to the volume of the cylinder.





NOT TO SCALE

Calculate

(a) the volume of the cube,

..... cm^3 [1]

(b) the height, h, of the cylinder,

..... cm [3]

(c) the curved surface area of the cylinder.

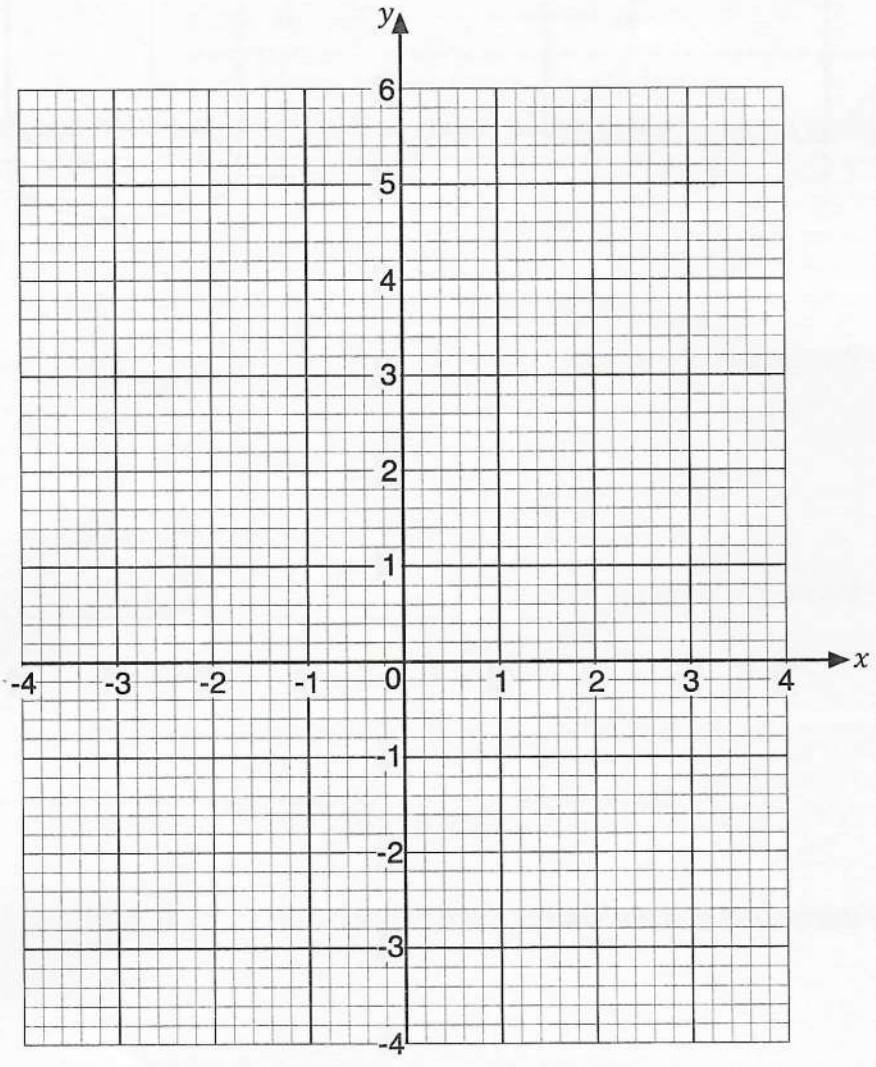
..... cm^2 [2]

6 The table shows the corresponding values of x and y for $y = x^2 + 2x - 3$.

x	-4	-3	-2	-1	0	1	2
y		0	-3		-3	0	5

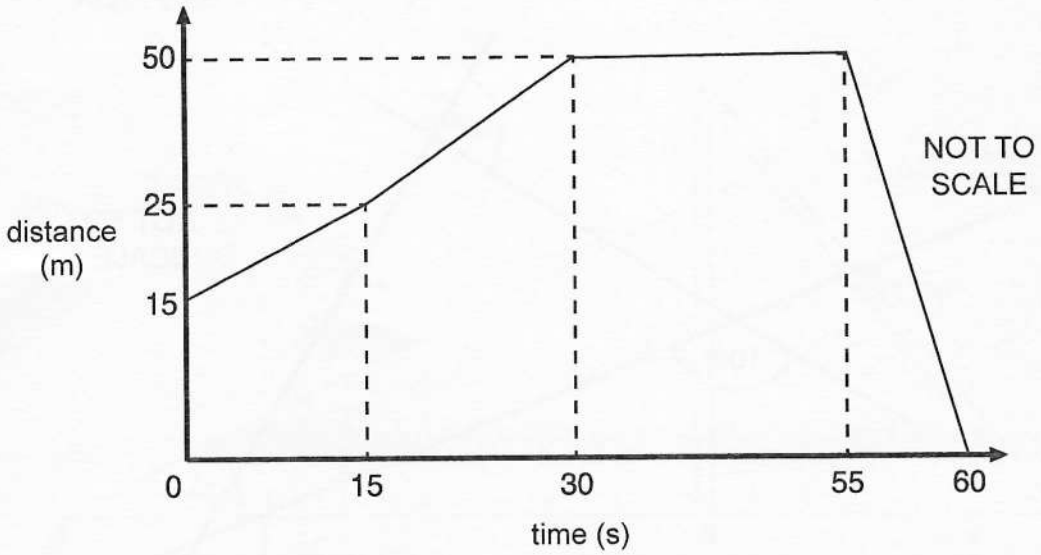
(a) Complete the table. [2]

(b) On the grid, draw the graph of $y = x^2 + 2x - 3$ for $-4 \leq x \leq 2$. [3]



(c) On the same grid, draw a line $y = x + 3$ for $-4 \leq x \leq 3$. [2]

7 The distance-time graph shows the movement of an object which lasted 60 seconds. The recording started when the distance of 15 m was covered.



(a) Calculate the speed between the 15th and the 30th seconds.

.....m/s [2]

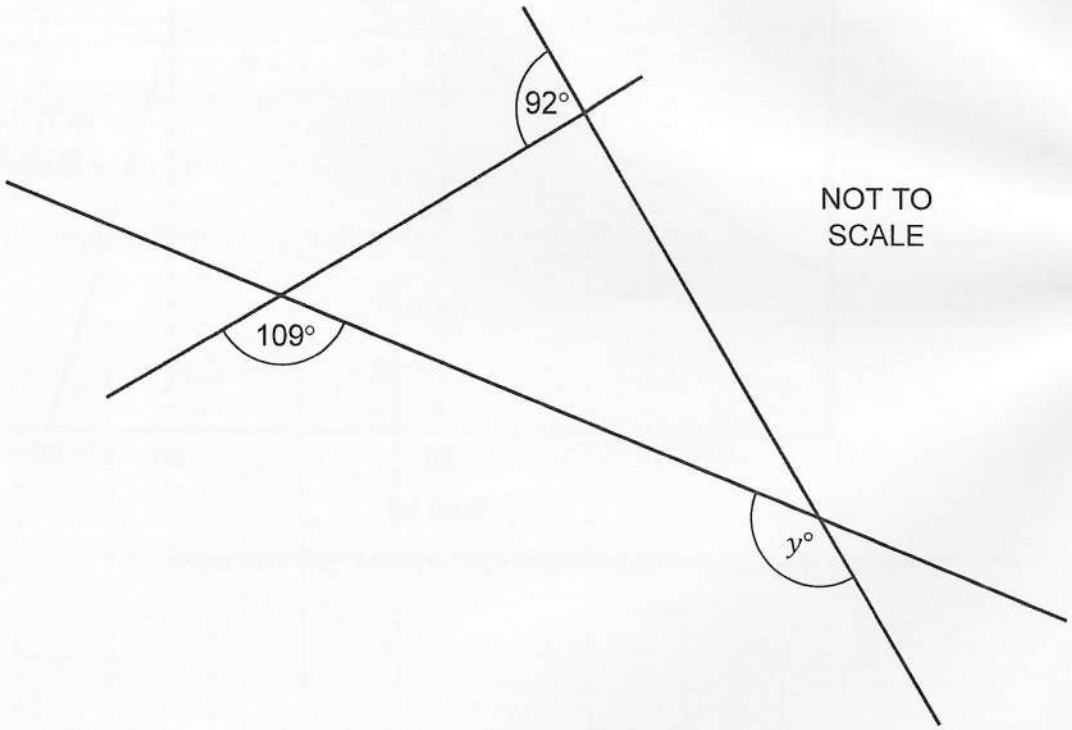
(b) Explain what was happening between the 30th and 55th seconds.

.....[1]

(c) Calculate the average speed for the movement recorded.

.....m/s [3]

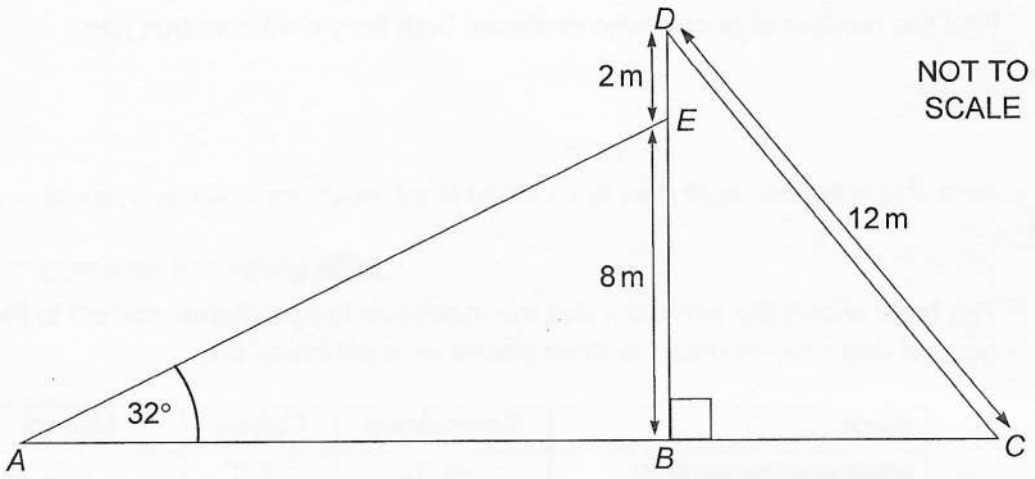
8 **(a)** The diagram shows three straight lines crossing each other at some points.



Calculate the size of angle y.

.....° [2]

(b) The diagram shows triangles *ABE* and *BCD* attached together.
DC = 12 m, *BE* = 8 m and *ED* = 2 m.
Angle *BAE* = 32°.



Calculate

(i) the size of the angle *BDC*,

..... ° [2]

(ii) the length *BC*,

..... m [2]

(iii) the area of triangle *ABE*.

..... m^2 [3]

9 **(a)** A ceremony was attended by 64 people.
40 people preferred fizzy drink.
36 people preferred fruit juice.
5 people preferred neither.

Find the number of people who preferred both fizzy drink and fruit juice.

..... [3]

(b) The table shows the minimum and the maximum temperatures, correct to the nearest degrees, recorded in three places on a particular day.

place	Semonkong	Oxbow	Moyeni
minimum temperature	−4 °C	−6 °C	8 °C
maximum temperature	10 °C	7 °C	15 °C

(i) State the place in which the lowest minimum temperature was recorded.

..... [1]

(ii) Calculate the temperature difference in Oxbow.

.....°C [1]

(iii) Find the least possible temperature recorded in Semonkong.

.....°C [1]

(c) An item is warmed constantly from −5.5 °C to 27.3°C in 8.2 minutes.

Calculate, in minutes and seconds, the time it takes to reach 22 °C.

..... minutes ..... seconds [3]

10 **(a)** Sempe buys kitchen items that cost M25 400.
He sells them and makes M8 400 profit.

Calculate the percentage profit.

..... % [2]

(b) Ntala buys bedroom items for M14 750 and sells them to make 18% profit.

Calculate the selling price.

M ..... [2]

(c) Zwane invests M22 800 for 16 months in an investment company which offers simple interest at a rate of 7.5% per annum.

Calculate the interest he gained.

M.....[2]

(d) Sibongile invested some money in a company that offers 6% compound interest per annum.
She receives a total of M75 000 after two years.

Calculate the amount she invested.

M ..... [3]

11 **(a)** Two cars left the same place at 9.51 p.m., one to town P and the other to town Q.

(i) The car to town P took 4.95 hours.

Find the time it arrived.

..... [3]

(ii) The other car arrived at town Q at 5.37 a.m.

Find, in hours and minutes, the time taken.

..... hours .....minutes [3]

(b) $\mathbf{P} = \begin{pmatrix} 2 \\ -6 \\ 0.5 \end{pmatrix}$ $\mathbf{Q} = \begin{pmatrix} 2 & 1 \\ -3 & 0 \end{pmatrix}$ $\mathbf{R} = \begin{pmatrix} -3 & -5 \\ 2 & 3 \end{pmatrix}$

Evaluate

(i) $-\frac{1}{2}\mathbf{P}$,

..... [1]

(ii) $2\mathbf{Q} - \mathbf{R}$.

..... [2]

12 $A = x^2 + 10$, $B = 2x + 6$ and $C = 3x + 4$ where x is positive.

(a) Given that the sum of A, B and C is 44, form an equation in x and show that it reduces to $x^2 + 5x - 24 = 0$.

[2]

(b) Solve the equation $x^2 + 5x - 24 = 0$.

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

(c) Hence, find the value of A + B.

..... [2]

13 **(a)** Expand and simplify $(x - 5)^2 - 10(2 - x)$.

..... [3]

(b) Given that $n = k + 0.75\sqrt{m}$, find the value of n when $k = 0.33$ and $m = 1.11$.

$n =$.....[2]

(c) Given that $n = k + \frac{3p}{4}$, make p the subject of the formula.

$p =$ ..... [3]