



**L-Università  
ta' Malta**

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE  
EXAMINATIONS BOARD

**SECONDARY EDUCATION APPLIED CERTIFICATE LEVEL  
2023 MAIN SESSION**

SUBJECT: **Mathematics**  
 PAPER NUMBER: Level 2-3  
 DATE: 27<sup>th</sup> April 2023  
 TIME: 9:00 a.m. to 11:05 a.m.

Answer **ALL** questions.

Show clearly all the necessary steps, explanations and construction lines in your working.

Unless otherwise stated, diagrams are drawn to scale.

The use of non-programmable electronic calculators with statistical functions and mathematical instruments is allowed.

Candidates are allowed to use transparencies for drawing transformations.

This paper carries a total of 100 marks.

<b>Section A</b>														
<b>Section B</b>	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	
Mark														
<b>Section C</b>	Q1	Q2	Q3	Q4	Q5									
Mark														
													<b>Total</b>	

**Section A – Multiple Choice Questions**

Circle the letter representing the correct answer.

Each question carries one mark.

This section carries a total of 10 marks.

**Questions and Answers**

1. Convert 3040 g to kilograms and grams.

- a) 3 kg 4 g                      b) 3 kg 400 g                      c) 3 kg 40 g                      d) 30 kg 40 g

2. Tanya recorded six long jump test scores:

142 cm, 143 cm, 148 cm, 152 cm, 162 cm, 177 cm

What is the median score?

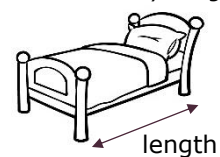
- a) 150 cm                      b) 154 cm                      c) 35 cm                      d) 152 cm

3. On a particular day, the temperature recorded in Oslo was  $-5^{\circ}\text{C}$  while the temperature in Valletta was  $11^{\circ}\text{C}$ . What is the difference in temperature between these two cities?

- a)  $15^{\circ}\text{C}$                       b)  $6^{\circ}\text{C}$                       c)  $16^{\circ}\text{C}$                       d)  $17^{\circ}\text{C}$

4. Estimate the length of an adult's bed.

*iHeartCraftyThings.com*



- a) 20 m                      b) 200 cm                      c) 130 cm                      d) 3000 mm

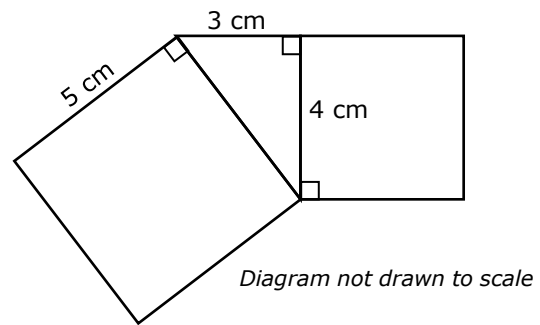
5. A lunch box is 21 cm long and 11 cm wide. It has a capacity of  $1617\text{ cm}^3$ . Calculate its height.

- a) 10 cm                      b) 7 cm                      c) 32 cm                      d) 8 cm

6. Exchange 198 Great Britain Pound (GBP) to Euro (EUR) given that  $1\text{ EUR} = 0.88\text{ GBP}$ .

- a) 225.00 EUR                      b) 174.24 EUR                      c) 197.12 EUR                      d) 211.00 EUR

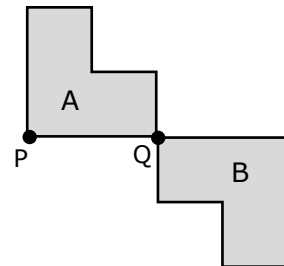
7. The following shape is made up of two squares and a right-angled triangle. Calculate the total area of the shape.



- a)  $53 \text{ cm}^2$       b)  $30 \text{ cm}^2$       c)  $39 \text{ cm}^2$       d)  $47 \text{ cm}^2$

8. Shape A has been rotated to form Shape B. Which **ONE** of the statements below describes this rotation?

- a) Rotation of  $90^\circ$  clockwise about Q  
 b) Rotation of  $90^\circ$  anticlockwise about P  
 c) Rotation of  $180^\circ$  about P  
 d) Rotation of  $180^\circ$  about Q



9. The height and depth of a goalpost are 2.0 m and 1.5 m respectively. Calculate the length of  $x$ .

*Diagram not drawn to scale*



- a) 6.25 m      b) 1.3 m      c) 2.5 m      d) 3.5 m

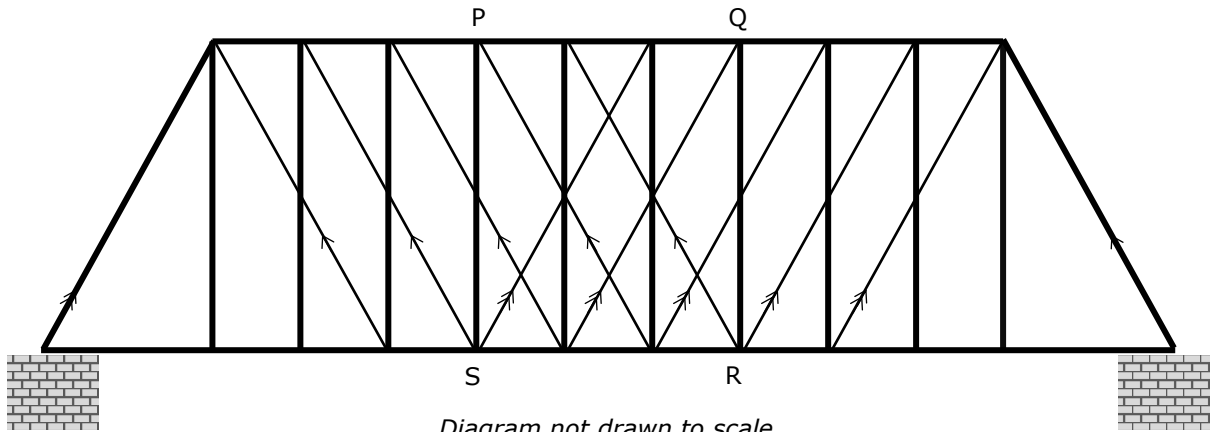
10. The time,  $T$ , taken to roast a turkey is given by  $T = 30m + r$ , where  $m$  is the mass of the turkey and  $r$  is the time taken to brown the turkey. Make  $m$  subject of the formula.

- a)  $m = T - 30 - r$   
 b)  $m = \frac{T - r}{30}$   
 c)  $m = \frac{T}{30} - r$   
 d)  $m = 30(T - r)$

**Section B**

Write your answers in the available space on the examination paper.  
This section carries a total of 65 marks.

1. An architect is designing a bridge. The bridge structure is made up of horizontal and vertical bars in addition to slanting bars that provide support. Slanting bars are parallel to each other as shown in the diagram below.



- (a) Name **THREE** types of quadrilaterals shown in the diagram.

(2)

- (b) The diagram below shows a section of the bridge structure. Work out the size of the angles marked  $a$ ,  $b$ ,  $c$  and  $d$ , giving reasons for your answers.

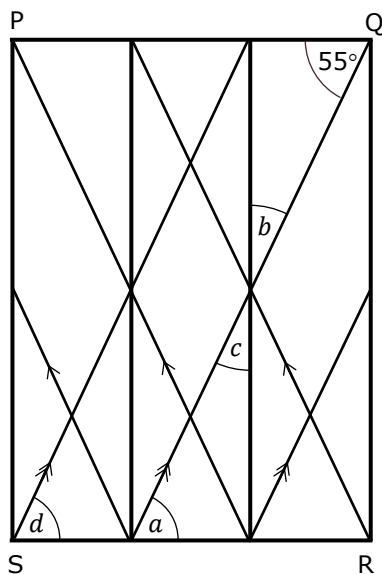


Diagram not drawn to scale

(8)

**(Total: 10 marks)**

2. The shop at the Dragons Football Club has different coloured team kits consisting of shirts and shorts.

		Shorts		
		Blue (B)	Yellow (Y)	Red (R)
Shirts	Blue (B)	(B, B)		
	Yellow (Y)			
	Red (R)		(R, Y)	
	Striped (S)		(S, Y)	(S, R)

- (a) Complete the possibility space to show **all** the possible combinations of football kits. (2)
- (b) What is the probability that the first kit sold consists of:
- (i) a yellow shirt and red shorts? (1)
- (ii) a shirt and shorts of the same colour? (1)
- (c) What is the probability that the first kit sold includes yellow shorts? (1)

**(Total: 5 marks)**

3. Mrs Bonnici wants to insure her house. The building is valued at €200 000 and the value of the contents is €30 000. The insurance company charges 0.15% on the value of the building and 0.20% on the value of the contents. Administration charges amount to €30.

Calculate the total amount of money that Mrs Bonnici paid to insure her house.

**(Total: 4 marks)**

4. A sports club is collecting data on the height of its players. The heights, in metres, of the players are:

1.62	1.75	1.61	1.80
1.68	1.78	1.84	1.85
1.81	1.69	1.82	1.71
1.72	1.67	1.72	1.83

- (a) Fill in the frequency table to represent this information.

Height (in metres)	Tally	Frequency
$1.60 < h \leq 1.65$		
$1.65 < h \leq 1.70$		
$1.70 < h \leq 1.75$		
$1.75 < h \leq 1.80$		
$1.80 < h \leq 1.85$		

(2)

- (b) How many players are taller than 1.75 m?

(1)

**(Total: 3 marks)**

5. (a) In a garden, the ratio of the area of the lawn to the area of the flowerbed is 12 : 5. The area of the lawn and the area of the flowerbed together amount to 357 m<sup>2</sup>. Work out the area of the lawn.

(3)

(b) In the garden there is a model train built on a scale of 1 : 20.

(i) Calculate the actual height of the train if the model is 24 cm high.

(2)

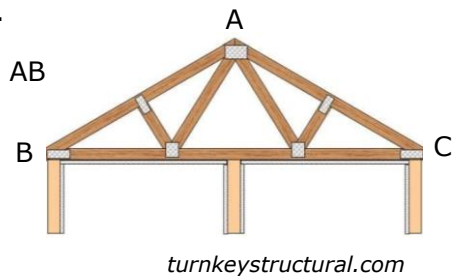
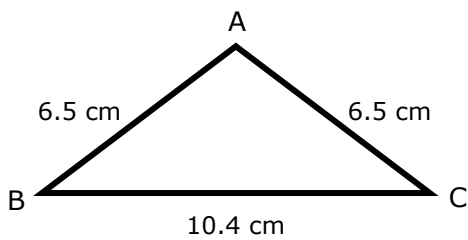
(ii) How high is the door of the model train if the actual door is 2 m high?  
Give your answer in centimetres.

(2)

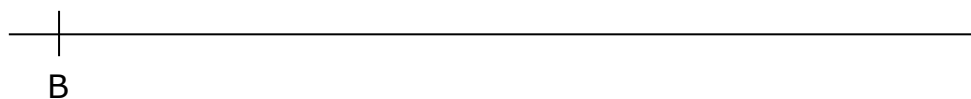
**(Total: 7 marks)**

6. The diagram shows a sketch of a section of a model hut.

(a) Use ruler and compasses only to construct triangle ABC  
Point B has already been marked for you.



*Diagrams not drawn to scale*



(3)

(b) Measure  $\hat{BAC}$ .

(1)

**(Total: 4 marks)**

7. A mother shared €1680 among her three children. Abel gets  $\frac{3}{7}$  of the money, Ben gets €600 and Carla gets the rest.

(a) How much money does Abel get?

(2)

(b) Write Ben's share as a fraction of the whole amount.  
Give your answer in its simplest form.

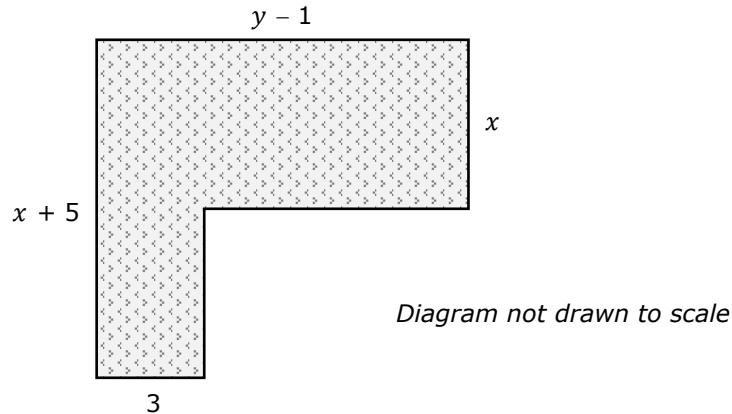
(2)

(c) What fraction of the whole sum of money does Carla get?  
Give your answer in its simplest form.

(3)

**(Total: 7 marks)**

8. The diagram below shows a plot of land that needs to be fenced. All lengths are in metres.



(a) Write an expression for the perimeter of the plot of land.  
Give your answer in its simplest form.

(3)

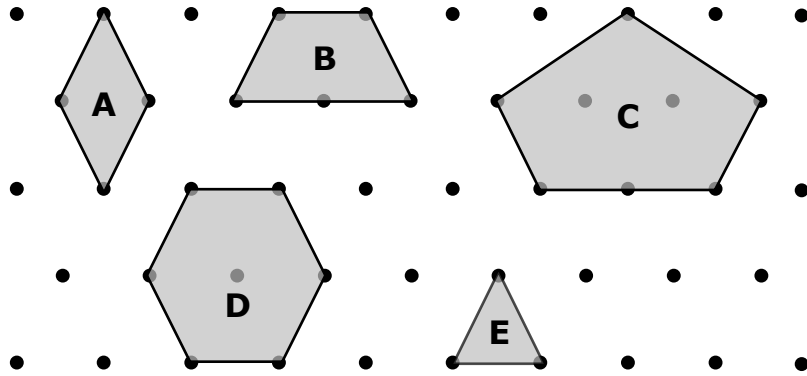
(b) If  $x = 5$  and  $y = 12$ , what length of fencing is needed for the plot of land?

(2)

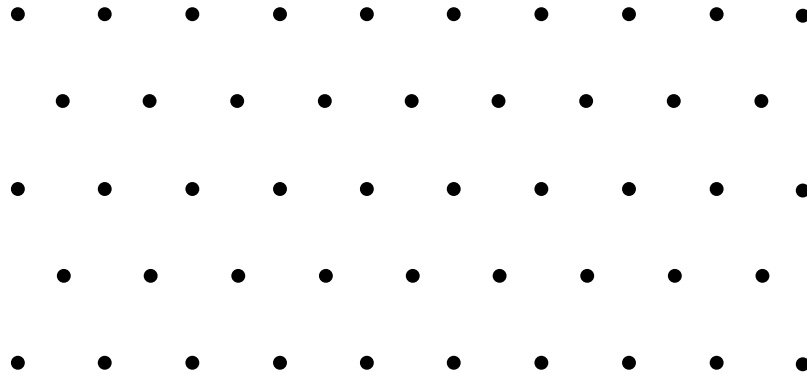
**(Total: 5 marks)**



9. Janice wants to tile the floor of a room using two of the following tessellating shapes.



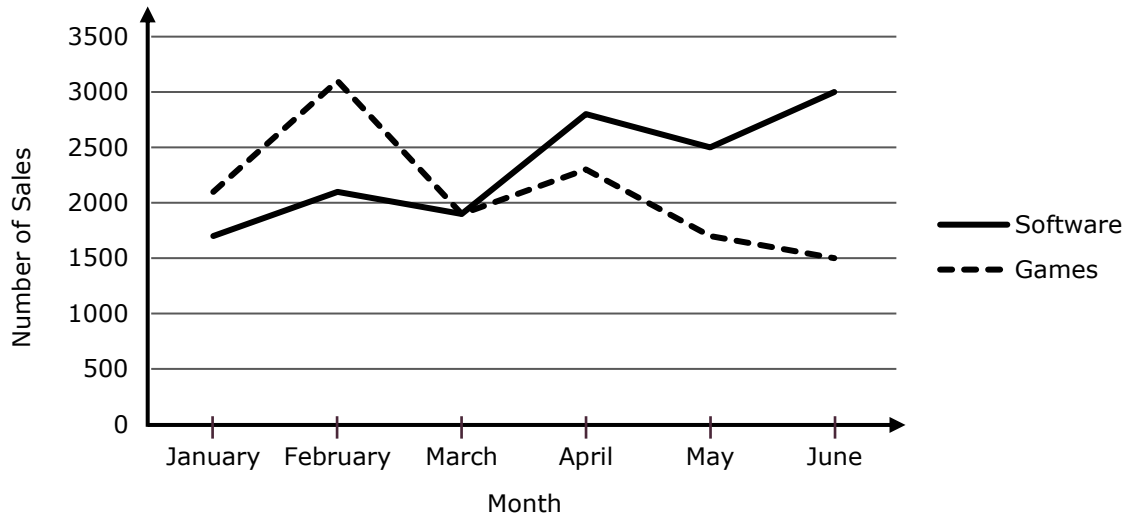
Use two shapes from the ones above to draw a tessellating pattern.  
Cover as much as possible of the grid provided below.



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**(Total: 2 marks)**

10. The line graphs below show the sales of software and games by an IT company during the first six months of the year.



(a) In which months was the number of games sold greater than the number of software sold?

(1)

(b) By how much is the number of software sold in June greater than the number of games sold during the same month?

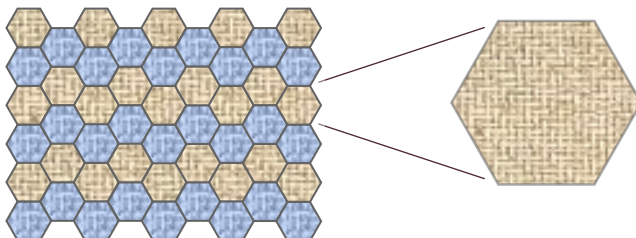
(2)

(c) Estimate the total number of sales in February.

(2)

**(Total: 5 marks)**

11. The design of a carpet is made up of fifty regular hexagons, all of the same size. Calculate the sum of the interior angles of one of these hexagons.



**(Total: 3 marks)**

12.



- (a) A drone travels in a straight line from Naxxar to Valletta as shown in the diagram.
  - (i) Measure the bearing of Valletta from Naxxar. (1)
  - (ii) What is the bearing of Naxxar from Valletta? (2)
- (b) At Valletta, the drone changes direction. It now travels on a bearing of  $220^\circ$  until it reaches one of the other destinations shown on the map.
  - (i) Draw the straight path travelled by the drone in this direction. (1)
  - (ii) Name a destination on the map that lies on this path. (1)

**(Total: 5 marks)**

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13. Three brands produce toothpaste in the different sizes shown below:



<b>Dental Care</b> 125 ml tube €2.85
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<b>White Teeth</b> 100 ml tube €2.19
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<b>Best Smile</b> 50 ml tube €1.32
--

*Adapted from vectorstock.com and gograph.com*

Work out which one of these brands of toothpaste gives the best value for money.

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**(Total: 5 marks)**

**Section C****Real Life Situation – At the De Vilhena Theatre**

Write your answers in the available space on the examination paper.  
This section carries a total of 25 marks.

1. The table below shows the seat categories at the De Vilhena Theatre. For each category, the number of seats available and the cost of the ticket for each seat is given.

Seat Category	Number of Tickets available	Cost per Ticket
Gold	120	€40
Silver	58	€32
Bronze	72	€24
There is a 15% discount for early booking.		

- (a) On a Saturday evening, 108 Gold tickets, 42 Silver tickets and 54 Bronze tickets were sold. What percentage of the tickets were sold?

(3)

- (b) Katrine bought two Gold tickets, three Silver tickets and four Bronze tickets with the early booking offer. How much did the nine tickets cost her altogether?

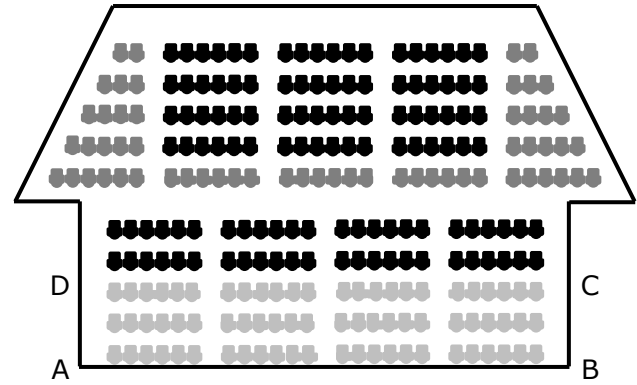
(3)

- (c) Julian received a gift voucher worth €160 to spend on tickets for the show. He cannot use the voucher with the early booking offer. He wants to buy six tickets which amount exactly to €160. Which combination of six tickets can he buy?

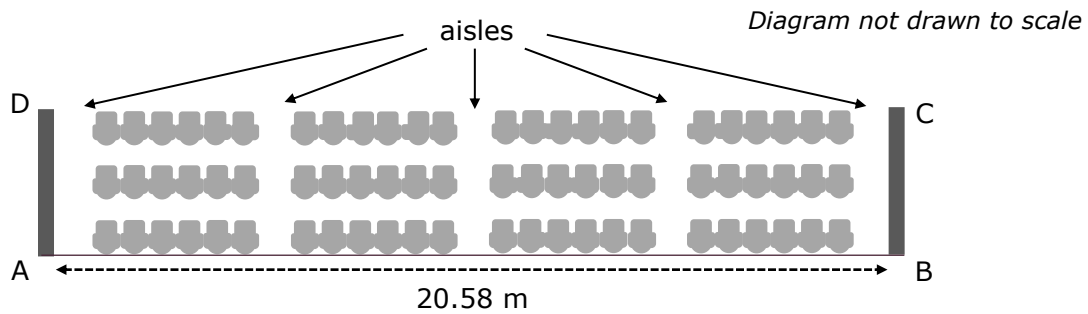
(2)

**(Total: 8 marks)**

2. The diagram shows the seating arrangement at the De Vilhena Theatre.



The seating reserved for the Bronze ticket holders is enlarged below.  
 The width, AB, of the hall is 20.58 m. Each aisle is 1.5 m wide.



Calculate the width of each seat. Give your answer in centimetres.

**(Total: 3 marks)**

3. The following is the programme of one of the shows at the theatre.  
The show starts at 6.30 pm.

Duration	Item
45 minutes	Spirit of the Musicals <i>by the De Vilhena Orchestra</i>
30 minutes	Music Selection from the 90s <i>by Carlo Lobello and Maria Felice</i>
20 minutes	Intermission
45 minutes	Amadeus Goes Pop <i>by the National Youth Orchestra</i>

- (a) At what time will the Intermission start?

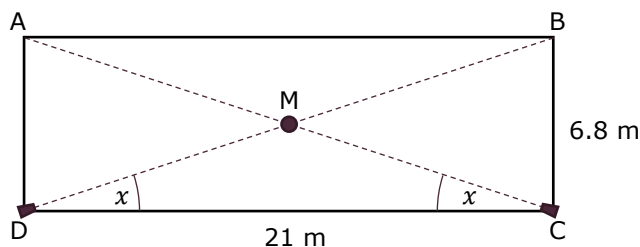
(1)

- (b) On one evening, the show started on time and finished at 9.12 pm.  
How many minutes did the show take longer than planned?

(3)

**(Total: 4 marks)**

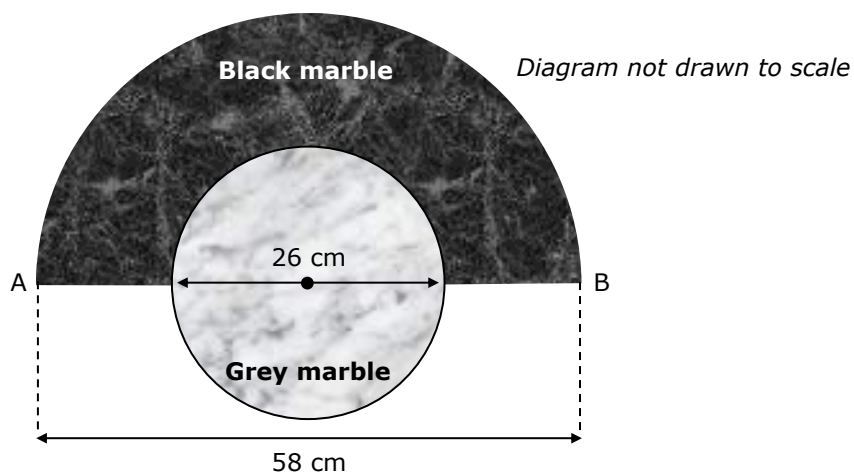
4. The diagram below shows the dimensions of the rectangular stage. Two spotlights, placed at C and D, light the stage. At what angle  $x$  must the spotlights be placed so that the spot in the middle of the stage, M, is best lit?



*Diagram not drawn to scale*

**(Total: 3 marks)**

5. The following diagram shows the marble base of the emblem of the De Vilhena Theatre. The base consists of a hollowed black semi-circular marble and a grey circular marble. The diameter of the grey circular marble is 26 cm and the straight distance from A to B is 58 cm.



- (a) Calculate the circumference of the grey circular marble.

(2)

- (b) Calculate the total area of marble needed to make the base of the emblem.

(5)

**(Total: 7 marks)**

**End of Paper**