L-Università ta' Malta	MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD **SECONDARY EDUCATION CERTIFICATE LEVEL 2019 SUPPLEMENTARY SESSION**

SUBJECT:	**Mathematics**	PAPER:	I – Section A (Non-Calculator Section)
DATE:	31st August 2019	TIME:	20 minutes

Attempt **ALL** questions.

Write your answers in the space available on the examination paper.
The use of calculators and protractors is **not** allowed.
It is not necessary to show your working.
This paper carries a total of 20 marks.

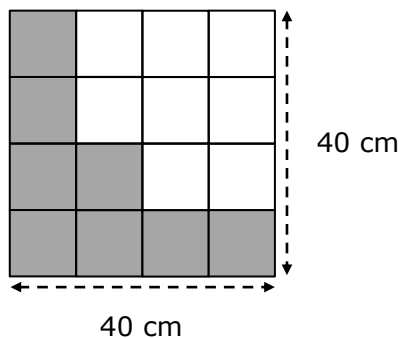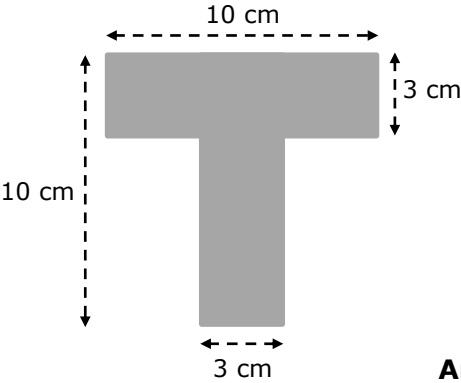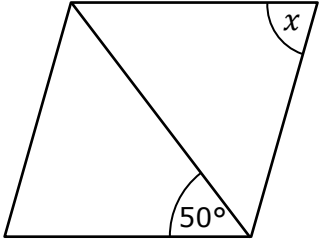| QUESTIONS AND ANSWERS ALL QUESTIONS CARRY ONE MARK	SPACE FOR ROUGH WORK (IF NECESSARY)
1 Complete the sequence: 12.8, 13.2, 13.6, _____, _____.	
2 Calculate the value of: $2 \times 5 + 100 \div 5$ **Ans** _____	
3 Find the value of $4c - 3d$ when $c = \frac{1}{2}$ and $d = -3$. **Ans** _____	
4 Calculate the area of the shaded part. 40 cm 40 cm **Ans** _____	

QUESTIONS AND ANSWERS ALL QUESTIONS CARRY ONE MARK	SPACE FOR ROUGH WORK (IF NECESSARY)
5 A company director receives $\dfrac{2}{15}$ of the company's profit. The company made a profit of €45 600. How much did the company director receive? **Ans** _____	
6 Express 105 g as a percentage of 3 kg. **Ans** _____	
7 Work out: $\sqrt[3]{8000}$ **Ans** _____	
8 Find the missing number. 3 − ____ = 7 **Ans** _____	
9 Which of the following is the smaller? $\dfrac{2}{3}$ or 0.7 **Ans** _____	
10 Find the value of: $6^{½} \times 6^{½}$ **Ans** _____	
11 A train travels at a speed of 120 km/h. How long does it take the train to travel 300 km? **Ans** _____	

QUESTIONS AND ANSWERS ALL QUESTIONS CARRY ONE MARK	SPACE FOR ROUGH WORK (IF Necessary)
12 A number is chosen at random from the set of numbers {2, 3, 4, 5, 6, 7, 8, 9, 10, 11}. Find the probability that it is a prime number. Ans _____	
13 The circumference of a circle is 72 cm long. Estimate the length of the radius of the circle. (Take π to be equal to 3.) Ans _____	
14 Work out the perimeter of the shape below. Diagram not drawn to scale Ans _____	
15 Work out the number of seconds in half an hour. Ans _____	
16 The diagram shows a rhombus. Find the value of the angle marked x. Diagram not drawn to scale Ans _____	

Question 14 figure labels: 10 cm, 3 cm, 10 cm, 3 cm

Question 16 figure labels: x, 50°

QUESTIONS AND ANSWERS ALL QUESTIONS CARRY ONE MARK	SPACE FOR ROUGH WORK (IF NECESSARY)
17 A sheet of paper is 0.012 cm thick. How many sheets are there in a pile 4.8 cm high? **Ans** _____	
18 A bag contains green and yellow beads only. In all there are 60 beads. The probability of picking a green bead from the bag is $\frac{3}{5}$. How many beads are yellow? **Ans** _____	
19 Which one of the following statements is FALSE: **A.** 13 is a factor of 39 **B.** 13 is a prime number **C.** 13 is a multiple of 26 **D.** 13 divided by 3 is $4\frac{1}{3}$ **Ans** _____	
20 Seven cups of tea and four sandwiches cost €26. Two cups of tea and five sandwiches cost €19. What is the total cost of one cup of tea and one sandwich? **Ans** _____	

L-Università ta' Malta

**SECONDARY EDUCATION CERTIFICATE LEVEL
2019 SUPPLEMENTARY SESSION**

SUBJECT:	**Mathematics**
PAPER NUMBER:	I – Section B (Calculator Section)
DATE:	31st August 2019
TIME:	1hr and 45 minutes

Answer **ALL** questions.

Write your answers in the space available on the examination paper.

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 80 marks.

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Section A	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**Total**

1   (a)   Simplify:

     (i) $a \times a \times a \times a \times a \times a =$ (1)

     (ii) $\dfrac{t^5 \times t^6}{t^8} =$

                                                      (2)

     (iii) $(p^4 \times p^2) + (3p^8 \times p^{-2}) =$

                                                        (2)

  (b) Solve the equation: $3x - 2 = 5x - 9$

                                                        (2)

  (c) Work out the value of $x^3 + 5x$ when $x = -2$.

                                                        (2)

(Total: 9 marks)

2   (a)   (i)   Express 336 as a product of prime factors.

                                                        (2)

     (ii) 336 is multiplied by a number n to get a perfect square.
         What is the least value of n?

                                                        (1)

  (b) Here is a list of numbers: 2, 6, 32, 40
       Which **TWO** numbers from the list can you multiply to get a cubic number?

                                                        (1)

(Total: 4 marks)

3   The sides of triangle PQR are such that PQ = $(x + 1)$ cm, QR = $3x$ cm and PR = $(4x- 3)$ cm.

  (a)   The perimeter of the triangle is 30 cm. Find the value of x.

(3)

  (b)   (i)   Show that triangle PQR is a right-angled triangle.

(2)

       (ii)   At which vertex, P, Q or R does the right angle lie?

(1)

(Total: 6 marks)

4   An exhibition hall is in the shape of a cuboid. L is the length of the longer side and W is the length of the shorter side. The hall has height H. All measurements are given in metres.

The two longer walls and one of the shorter walls are painted green.

(a) Show that the total area of the green walls is given by A, where $A = H(2L + W)$.

(2)

(b)   The hall is 8 m long, 6 m wide and 5 m high. Calculate the area of the green walls.

(2)

(c)   Make L the subject of the formula $A = H(2L + W)$.

(3)

(Total: 7 marks)

5   An international electronics company produces TV sets, Console Games, Smartphones and Digital Cameras.

The table below shows the number of each item produced in 2018.

	TV sets	Console Games	Smartphones	Digital Cameras
Number of items produced in 2018	1.28×10^7	1.9×10^7	1.35×10^7	4.8×10^6

(a) Use the table above to complete the following statements:

(i)   The number of Digital Cameras produced, given as an ordinary number, is

_____.

(1)

(ii) The company produced _____ million Console Games.

(1)

(iii) The company produced _____ more Smartphones than TV sets.

(1)

(b) Write and simplify the following ratio for 2018:

number of TV sets produced : number of Digital Cameras produced

(2)

(c) Work out the total number of items produced in 2018.

(1)

(d) Estimate the number of Digital Cameras produced per month in 2018.

(1)

(Total: 7 marks)

6   (a)   A sofa is sold for €1188 making a profit of 8%.
            Calculate the cost price of the sofa.

                                                                                    (3)

     (b)   A furniture shop sells a particular model of a bedroom set for €3600.
            Clients pay a down payment on purchase and the rest in monthly instalments.

            (i)   Tiziana pays 20% of the price as down payment and pays the rest in monthly
                   instalments for two years. Calculate the amount Tiziana pays every month.

                                                                                    (3)

            (ii)   Stefan pays €70 in monthly instalments for 3 years for the same bedroom model.
                   Work out the percentage of the price Stefan pays as down payment for the
                   bedroom set.

                                                                                    (3)

                                                                      (Total: 9 marks)

7   A straight line has equation $2y = 3x - 6$.

(a) Write down the gradient of the line.

(2)

(b) Find the y-coordinate of the point on the line at which the value of x is 3.

(2)

(c) Write down the coordinates of the point where this line cuts the y-axis.

(2)

(d) Show that the point (-2, -6) lies on the line $2y = 3x - 6$.

(1)

(Total: 7 marks)

8   John has a sum of €235 that is made up of 5 euro notes and 20 euro notes.
     He has twelve more 5 euro notes than 20 euro notes.

     (a)   Let x be the number of 5 euro notes.
           Let y be the number of 20 euro notes.
           Write down **TWO** equations in terms of x and y to represent the above information.

                                                                                        (2)

     (b)   Find the number of 5 euro notes and the number of 20 euro notes that John has.

                                                                                        (4)

                                                                          (Total: 6 marks)

9   AOD is a sector of a circle, centre O and radius 10.4 cm.
     Point C lies on OD, such that OC = CD and angle $B\hat{C}O$ = 90°.
     Point B lies on OA and angle $B\hat{O}C$ = 30°.
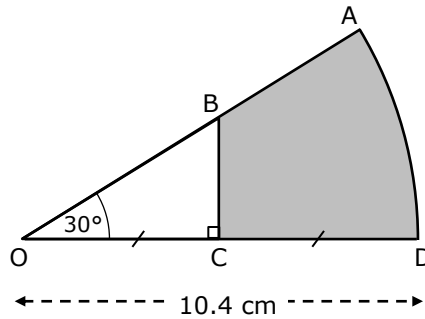
Diagram not drawn to scale

(a)   Calculate the area of sector AOD.

(2)

(b)   Find the length of BC.

(3)

(c)   Work out the area of the shaded part.

(3)

(Total: 8 marks)

10 (a) Alex made a survey on the number of passengers travelling in cars as they entered a road in the morning.

Alex's Morning Survey	
Number of passengers in a car	Frequency
1	144
2	70
3	16
4 or more	10

(i) How many cars were surveyed?

(1)

(ii) Using the circle below, draw a pie-chart to illustrate this data.

(4)

Samantha's Evening Survey
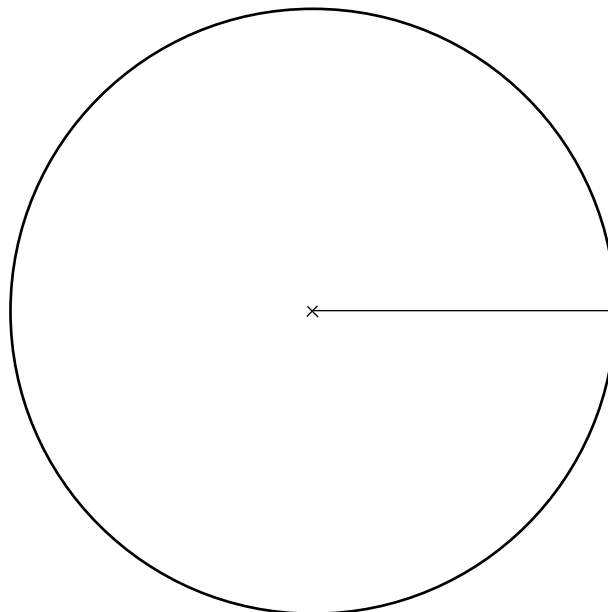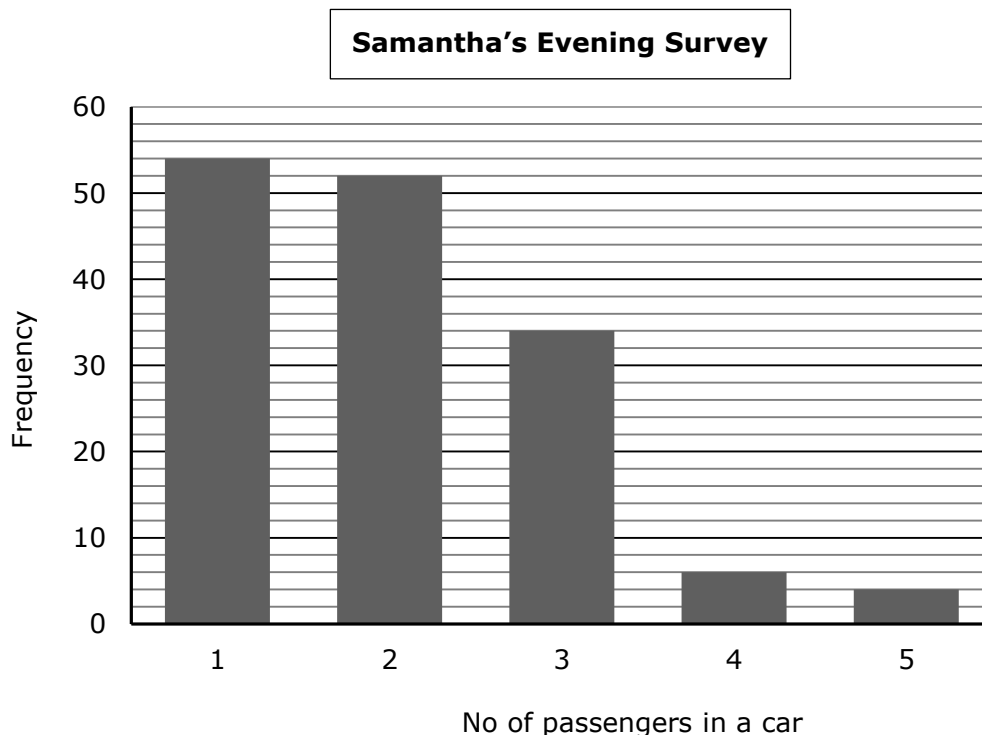
(b) Samantha made a survey of the number of passengers in 150 cars as they entered the same road in the evening. Her results are displayed in the bar graph above.

What is the probability that a car that enters the road in the evening has more than one passenger?

(2)

(c) Using Alex's table and Samantha's bar graph, Maria said:

"It is equally likely for cars to have 4 or more passengers in the morning as in the evening."

Is Maria correct? Explain your reasoning.

(2)

(Total: 9 marks)

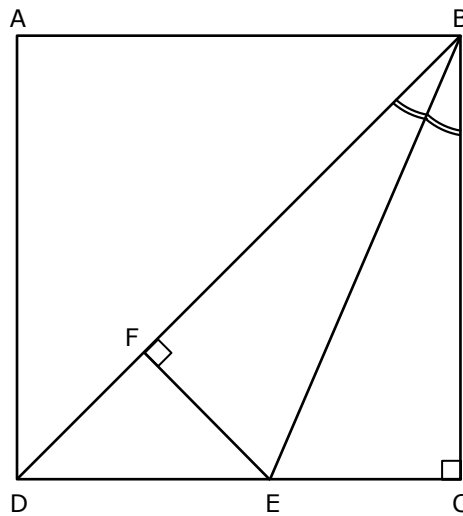11   ABCD is a square. Line BE bisects angle FB̂C. EF is perpendicular to the diagonal BD.

Diagram not drawn to scale

(a)   State the size of the following angles:

   (i)   BD̂C   (1)

   (i)   DÊF
                                                                              (1)

(b)   Work out the size of angle EB̂C.

                                                                              (2)

(c)   Prove that triangles BFE and BCE are congruent.

                                                                              (3)
(d)   Name a triangle that is similar but not congruent to triangle DFE.

                                                                              (1)

(Total: 8 marks)

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE
EXAMINATIONS BOARD

**SECONDARY EDUCATION CERTIFICATE LEVEL
2019 SUPPLEMENTARY SESSION**

SUBJECT:	**Mathematics**
PAPER NUMBER:	IIB
DATE:	31st August 2019
TIME:	4:00 p.m. to 6:05 p.m.

Answer **ALL** questions.

Write your answers in the space available on the examination paper.

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.

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Question No	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Mark										
Question No	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Mark										
								Total Mark		

1   Express:

(a)   2537 cents = € _____

(1)

(b)   3 km 20 m = _____ m

(1)

(c) $3\frac{1}{4}$ hour = _____ minutes

(1)

(Total: 3 marks)

2   Work out, showing all your working.
    Give your answer in its simplest form.

$$1\frac{1}{3} + \frac{7}{10} + \frac{4}{15}$$

(Total: 3 marks)

3   A farmer bought 2725 kg of cow food at the cost of €7.34 per kg.
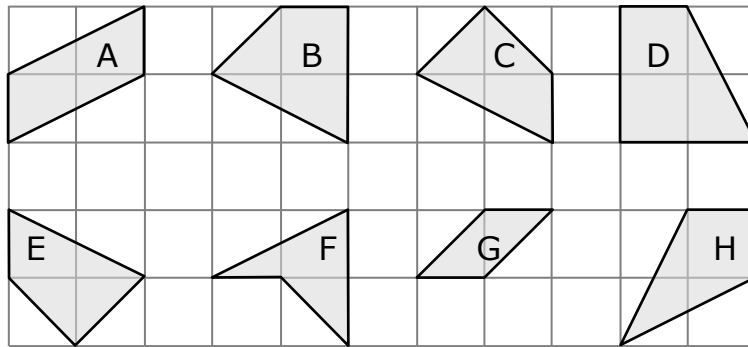
(a)   Estimate the total cost of the cow food.

(2)

(b)   Find the difference between your estimate in part (a) and the actual total cost of the cow food.

(2)

(Total: 4 marks)

4   The following are eight quadrilaterals drawn on a square grid.

(a)   Which quadrilateral is a trapezium?

(1)

(b)   Which **TWO** quadrilaterals are parallelograms?

(1)

(c)   Which quadrilateral contains a reflex angle?

(1)

(d)   Which quadrilateral has one line of symmetry?

(1)

(e)   Which **TWO** quadrilaterals are congruent?

(1)

(Total: 5 marks)

5   A bank is offering two investment schemes, A and B.

Scheme A	2% simple interest per annum for 4 years
Scheme B	2.5% simple interest per annum for 5 years

(a)   Anita wants to invest a sum of €25 000 in this bank.
       Work out the overall interest Anita gains if she invests her money in Scheme A.

(2)

(b)   Cathy has a sum of money.
       If she invests it in Scheme B she will get an overall interest of €4410.
       What is the value of Cathy's sum of money?

(2)

(Total: 4 marks)

6   The diagram shows an irregular heptagon.
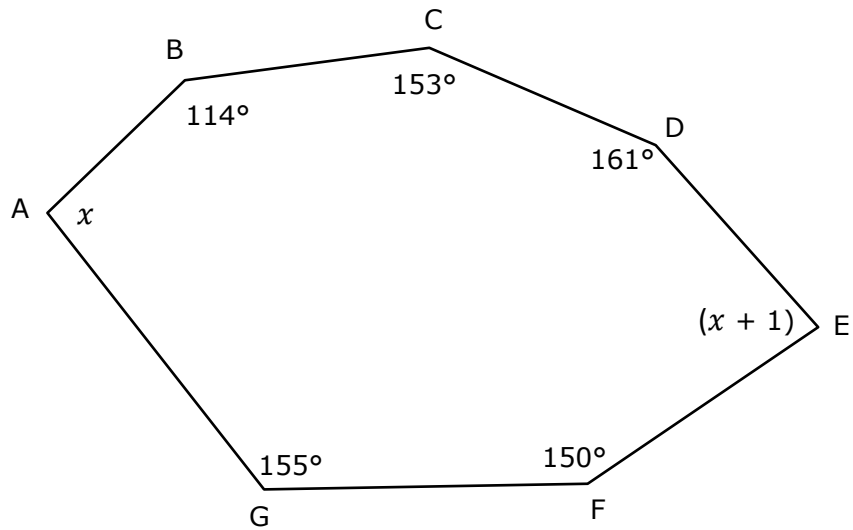
(a)   Calculate the sum of the interior angles of a heptagon.

(2)

(b)   Work out the size of angle A.

(3)

(Total: 5 marks)

7   Jeffrey and Meg are placing chocolates on a display tray.

Jeffrey states, "The chocolates can be placed in 8 equal rows."
Meg states, "They can also be placed in 12 equal rows."

What is the smallest number of chocolates to be placed on the tray?

(Total: 2 marks)

8   The diagram below shows a ladder, AB, leaning against a vertical wall BC.
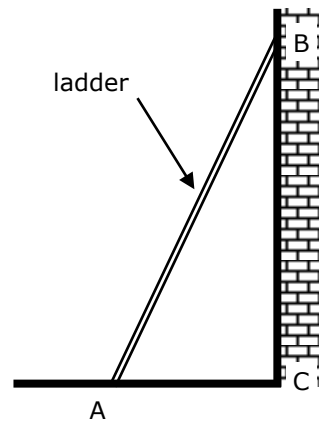
Diagram not drawn to scale

(a)   A ladder of length 4 m stands on horizontal ground, with the foot of the ladder at 1.5 m from the wall.

(i)   Calculate the angle this ladder makes with the ground.

(2)

(ii)   Calculate the height BC.

(2)

(b)   Matthew uses a ladder of length 5 m. How far from the wall does he place the ladder so that it makes an angle of 70° with the ground?

(2)

(Total: 6 marks)

9   Each year a school organises two fund-raising swimming events, one in April and another in June. In 2018, the school managed to raise a total of €1380 from the two events.
The ratio of the money raised in April to the money raised in June is $2 : 3$.

(a)   Calculate the amount of money raised in April.

(2)

(b)   Adam raised €31.50 in June, by collecting 75 cents for each lap he swam.
Work out the number of laps Adam swam.

(2)

(c)   The total amount of money raised by the school in 2018 was 8% less than the total amount of money raised in 2017. Calculate the amount of money raised in 2017.

(3)

(Total: 7 marks)

10   Simplify:

(a) $x(x + 17) - 7(2x - 1)$

(2)

(b) $\dfrac{4x + 3}{27} - \dfrac{5x}{3} + x$

(2)

(Total: 4 marks)

11 (a) An aeroplane has a maximum fuel capacity of 5311 US gallons.
         Calculate the maximum fuel capacity of the aeroplane, in litres, if 1 US gallon is equivalent to 3.79 litres. Give your answer correct to the nearest thousand litres.

(2)

(b) Melissa is building a model of the aeroplane with a scale of 1:200.

(i) The overall length of the model aeroplane is 15.5 cm.
     Work out the length of the real aeroplane in metres.

15.5 cm
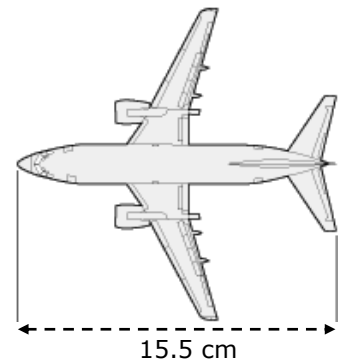
(2)

(ii) The real aeroplane has a tail height of 11.1 m.
      What is the tail height of the model aeroplane in centimetres?

11.1 m

http://www.geocities.ws

(2)
(Total: 6 marks)

12   Simon takes five tests in Carpentry. In order to pass, he needs to obtain an average of 70% or more. His percentage marks in the first four tests are: 80, 60, 55 and 90.

What is the least mark Simon needs to get in his fifth test for him to pass?

(Total: 3 marks)

13   In the diagram below the lines PQ and RS are parallel.
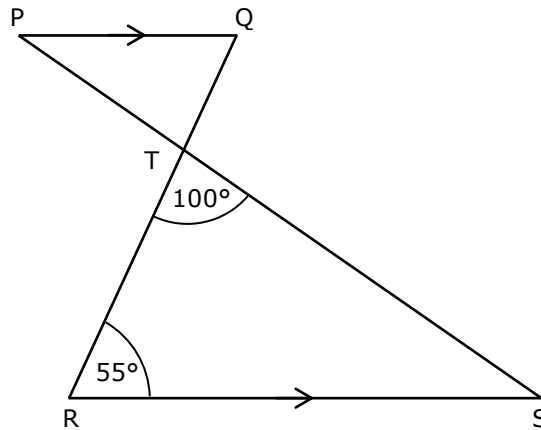The lines PS and RQ intersect at T.
Angle TR̂S = 55° and angle RT̂S = 100°.

Diagram not drawn to scale

(a)   Work out the value of angle QP̂T.

(2)

(b)   Complete the statement:
Triangle PTQ is similar to triangle _____.
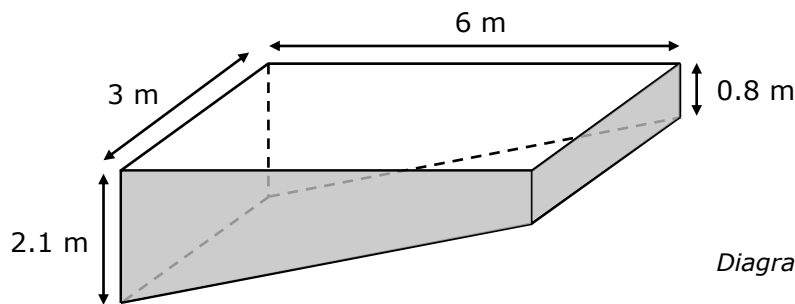
(1)

(c)   Given that PQ = 8.4 cm, QT = 5.6 cm and RS = 21 cm, calculate the length of RT.

(2)

(Total: 5 marks)

14 Kim has a pool in the shape of a prism as shown below.

Diagram not drawn to scale

(a) Calculate the area of the uniform cross-section of the pool. Give your answer in cm^2.

(2)

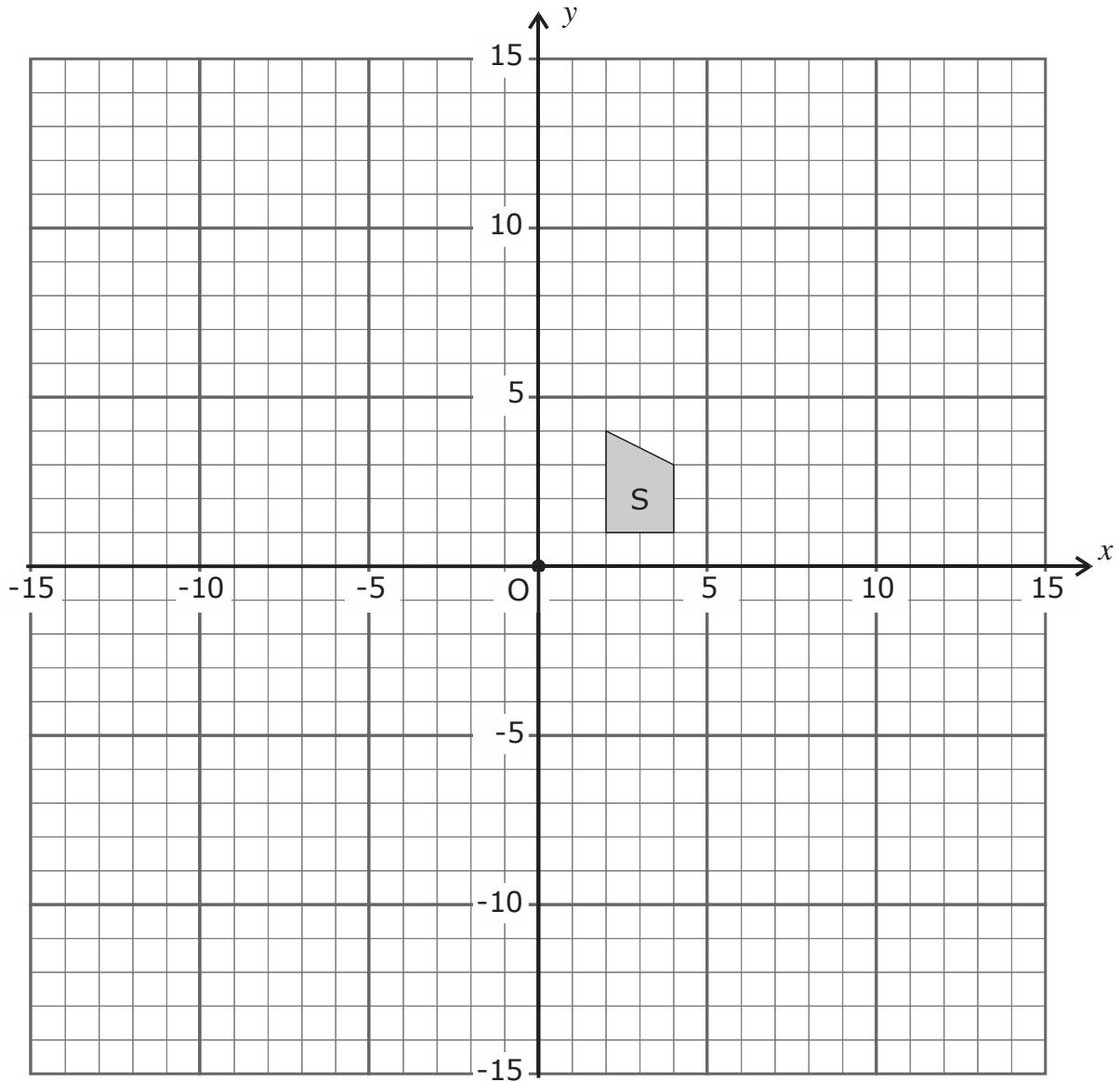(b) Work out the capacity of the pool when completely full.

(3)

(c) Kim wants to remove 2000 litres of water from the pool.
     Water is pumped out at the rate of 1.5 litres per second.
     How long will it take Kim to remove this volume of water?
     Give your answer in minutes.

(3)

(Total: 8 marks)

15

(a)   Translate Shape S by $\begin{pmatrix} -10 \\ 10 \end{pmatrix}$ to obtain Shape A.   (1)

(b)   Reflect Shape S in the y-axis to obtain Shape B.   (1)

(c)   Rotate Shape S by 90° clockwise about (0, 0) to obtain Shape C.   (2)

(d)   Reflect Shape S in the line $y = -x$ to obtain Shape D.   (2)

(e)   Enlarge Shape S by scale factor 3 about (0, 0) to obtain Shape E.   (2)

(Total: 8 marks)

16   Sticks of equal length are used to make up the shapes below.

Shape 1   Shape 2   Shape 3   Shape 4
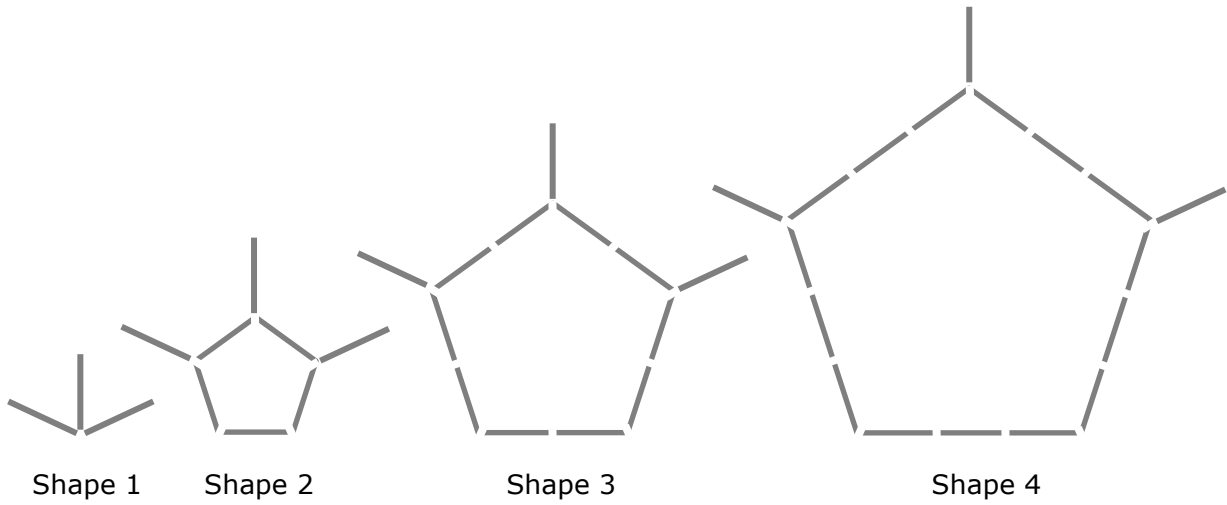
(a)   Complete the table below:

Shape No.	1	2	3	4	5		7	n
Number of sticks	3	8	13					

(3)

(b)   Which shape number is made up of 78 sticks?

(2)

(Total: 5 marks)

17   The diagram shows a circle centre O. Points A, B, C and D lie on the circumference of the circle such that angle BÂD = 63°.
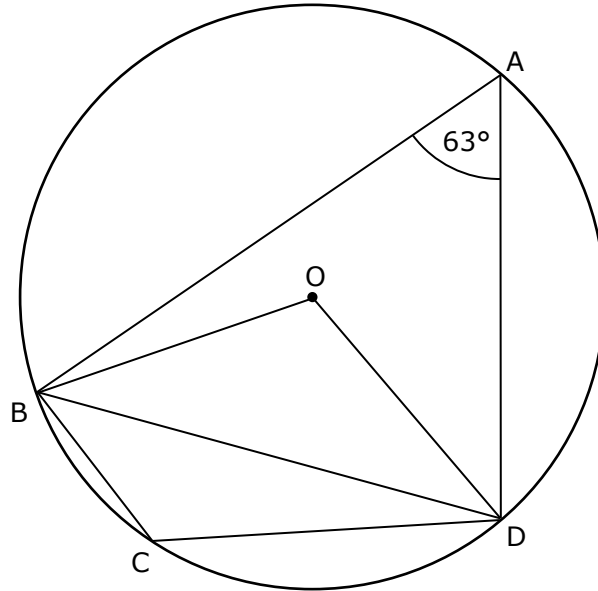

Diagram not drawn to scale

Work out the size of the following angles, giving reasons for your answers:

(a)   angle BÔD;

(2)

(b)   angle OD̂B;

(2)

(c)   angle BĈD.

(2)

(Total: 6 marks)

18   Three types of battery are made in a factory: Type A, Type B and Type C.

A sample of each type of battery was tested to check how many were defective. The results are shown in the table below.

Type of Battery	Number of Defective Batteries	Number of Non-Defective Batteries
Type A	15	135
Type B	22	178
Type C	27	273

(a)   How many batteries of Type A were tested?

(1)

(b)   What is the probability that a type A battery is defective?

(2)

(c)   Which type of battery is more likely to be defective? Explain your reasoning.

(2)

(Total: 5 marks)

19 The scale drawing below shows the location where Anton is staying while on holiday.
    The position of the hotel and the position of the closest bus station are shown.
    The scale of the drawing is such that 1 cm represents 200 m.
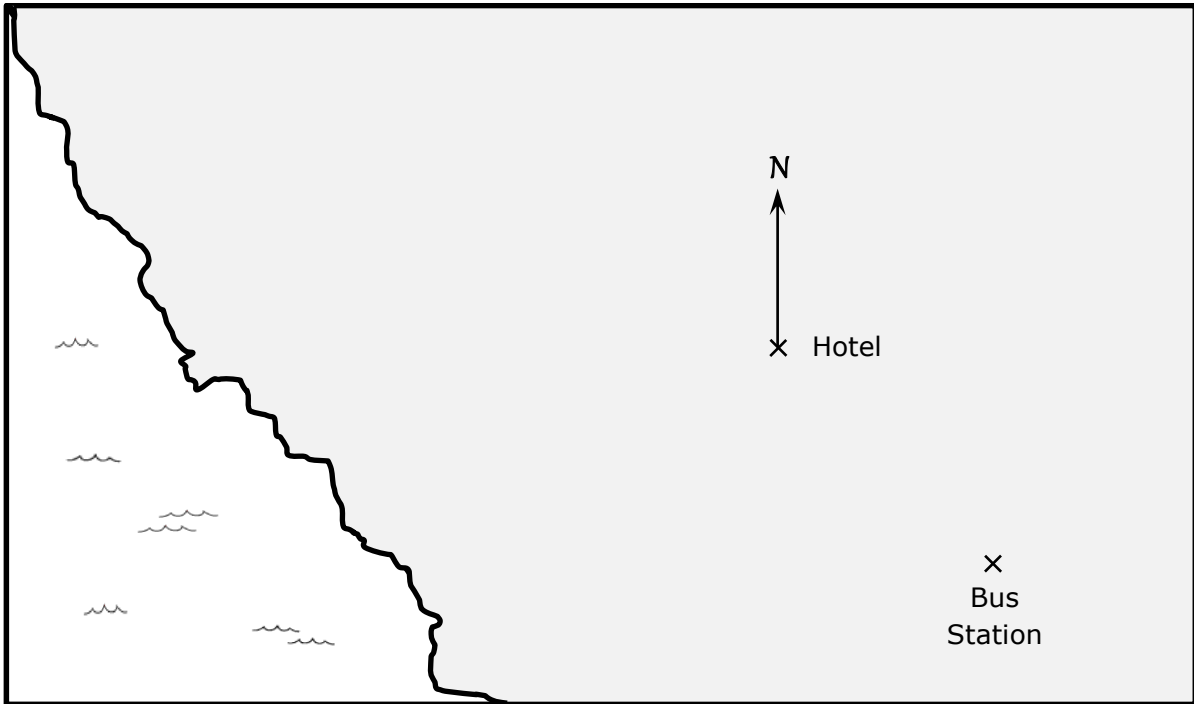
(a) What is the actual distance, in km, from the hotel to the bus station?

                                                                                    (2)

(b) Measure the bearing of the bus station from the hotel.

                                                                                    (1)

(c) Anton is going to visit a museum.
     The museum is at a distance of 1.6 km on a bearing of 295° from the hotel.
     Mark the position of the museum with a cross (×) on the scale drawing.

                                                                                    (2)

                                                             (Total: 5 marks)

20   Ian leaves his home in Paola at 13:30 and cycles to Mġarr which is 25 km away. On his way Ian stops at a coffee shop. The graph shows Ian's journey as well as that of his mother Tanya, who leaves Mġarr at 13:45 and drives straight home.
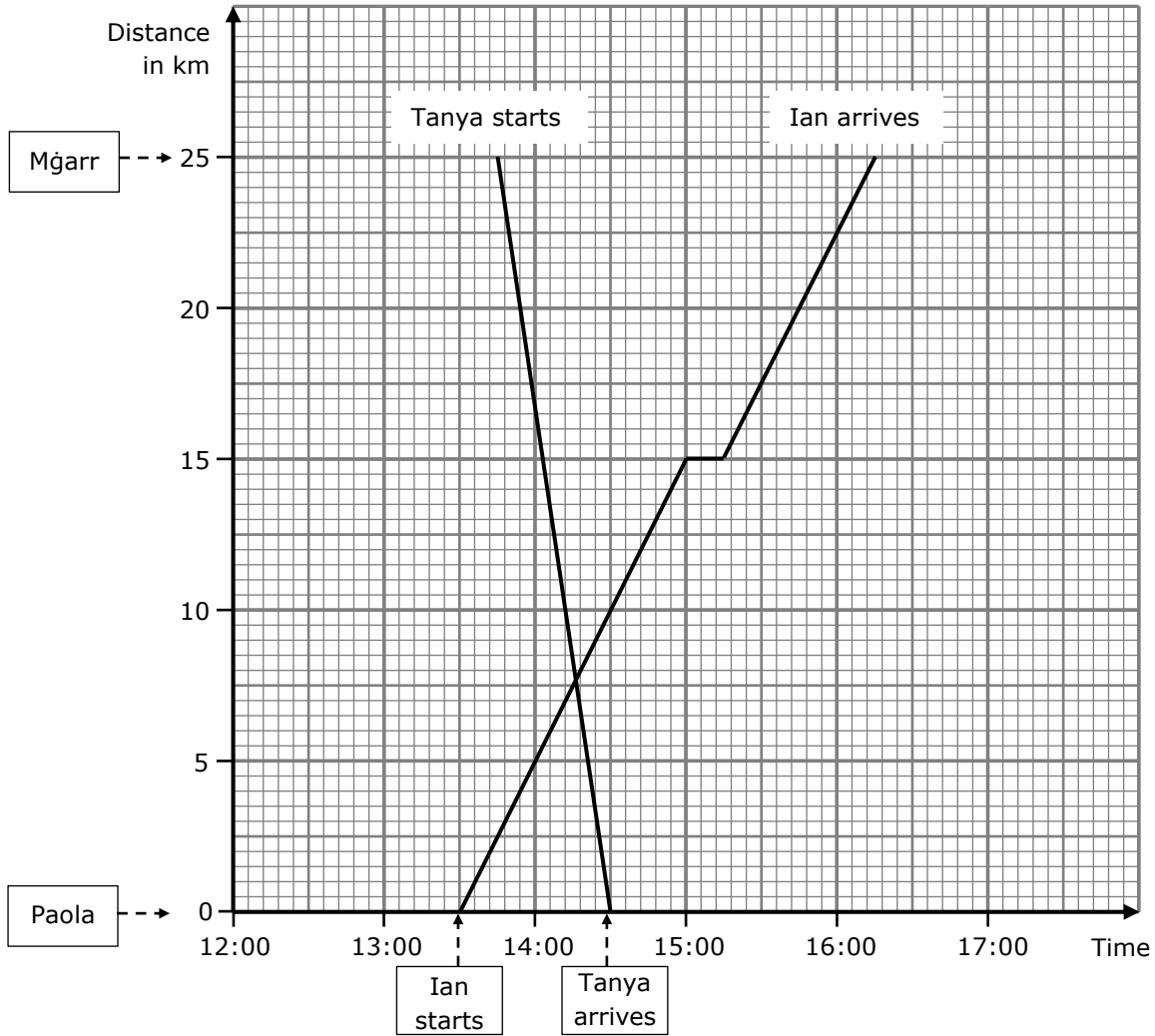
(a)   How long does Ian take to reach Mġarr from Paola?

(2)

(b)   For how many minutes does Ian stay at the coffee shop?

(1)

(c)   Find Tanya's average speed on her car trip in kilometres per hour.

(2)

(d)   How many kilometres from home is Ian when Tanya passes by?

(1)

(Total: 6 marks)

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