

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD
UNIVERSITY OF MALTA, MSIDA

SECONDARY EDUCATION CERTIFICATE LEVEL

MAY 2016 SESSION

SUBJECT: Mathematics
DATE: 30th April 2016

PAPER: I – Section A (Non-Calculator Section)
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 Write the following number in digit form:

Thirty five thousand and sixty eight

Ans _____

2 Find the value of a which satisfies this equation:

$$2a - 3 = 15$$

Ans _____

3

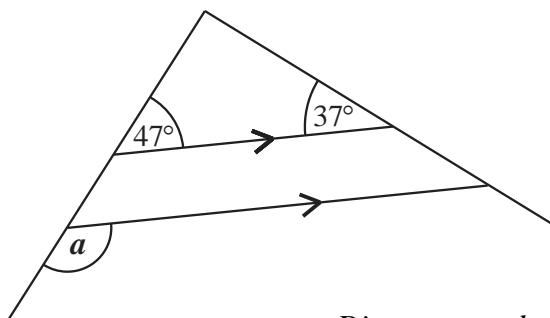
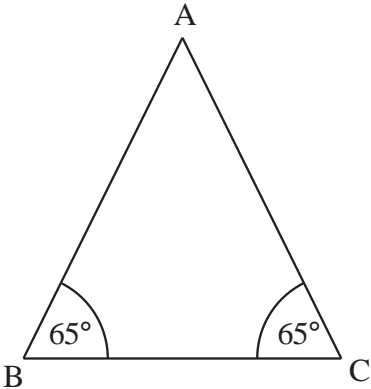
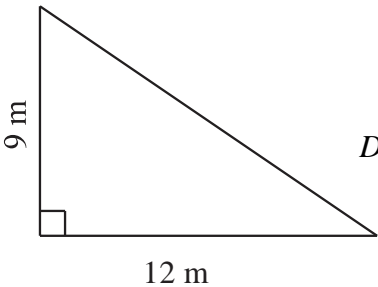


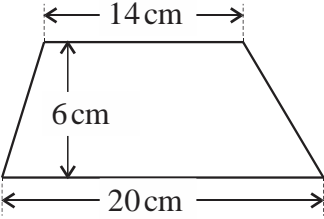
Diagram not drawn to scale

Work out the size of the angle marked a .

Ans _____

<p style="text-align: center;">QUESTIONS AND ANSWERS ALL QUESTIONS CARRY ONE MARK</p>	<p style="text-align: center;">SPACE FOR ROUGH WORK (IF NECESSARY)</p>
<p>4 Fill in the blank space to complete the statement below:</p> <p style="text-align: center;">$3.5 \times 10^8 =$ _____ million</p>	
<p>5 How many seconds are there in 15 minutes?</p> <p style="text-align: right;">Ans _____</p>	
<p>6 Write these numbers in order, smallest first.</p> <p style="text-align: center;">$\frac{3}{5}, \frac{3}{4}, \frac{2}{3}, 0.7$</p> <p style="text-align: right;">Ans _____</p>	
<p>7 Work out the value of $(0.5)^3$.</p> <p style="text-align: right;">Ans _____</p>	
<p>8 Find the total cost of 25 pens each costing €2.80.</p> <p style="text-align: right;">Ans _____</p>	
<p>9 Convert 3.154 m to cm, giving your answer to the nearest centimetre.</p> <p style="text-align: right;">Ans _____</p>	
<p>10 Work out an approximate value for the following expression.</p> <p style="text-align: center;">$\frac{99.7 \times 3.015}{1.98}$</p> <p style="text-align: right;">Ans _____</p>	

<p style="text-align: center;">QUESTIONS AND ANSWERS ALL QUESTIONS CARRY ONE MARK</p>	<p style="text-align: center;">SPACE FOR ROUGH WORK (IF NECESSARY)</p>
<p>11 Triangle ABC is isosceles with base angles equal to 65°. Work out the size of $\angle BAC$.</p> <div style="text-align: center;">  <p style="margin-left: 150px;"><i>Diagram not drawn to scale</i></p> </div> <p style="text-align: right;">Ans _____</p>	
<p>12 John slept at 23:15 on Tuesday and woke up at 03:00 on Wednesday. How long did John sleep during that night?</p> <p style="text-align: right;">Ans _____</p>	
<p>13 The figure shows a right angled triangle. The lengths of two sides are shown in the figure. Find the length of the third side.</p> <div style="text-align: center;">  <p style="margin-left: 150px;"><i>Diagram not drawn to scale</i></p> </div> <p style="text-align: right;">Ans _____</p>	
<p>14 A shopkeeper buys a coat for €60 and sells it at a profit of 25% on the cost price. What is the selling price?</p> <p style="text-align: right;">Ans _____</p>	

<p style="text-align: center;">QUESTIONS AND ANSWERS ALL QUESTIONS CARRY ONE MARK</p>	<p style="text-align: center;">SPACE FOR ROUGH WORK (IF NECESSARY)</p>
<p>15 The list gives the number of sweets in five bags of candy. Work out the mean number of sweets in a bag.</p> <p style="text-align: center;">46, 51, 52, 55, 51</p> <p style="text-align: right;">Ans _____</p>	
<p>16 Find the area of this trapezium.</p> <div style="text-align: center;">  <p style="margin-left: 100px;"><i>Diagram not drawn to scale</i></p> </div> <p style="text-align: right;">Ans _____</p>	
<p>17 A car is travelling with a speed of 45 km/h. What distance, in metres, does the car cover in one minute?</p> <p style="text-align: right;">Ans _____</p>	
<p>18 A square plot of land has an area of 14400 m². What is the length of the side of this square?</p> <p style="text-align: right;">Ans _____</p>	
<p>19 Sarah tosses a fair coin five times. She gets a prize if she gets five heads. The first four tosses are all heads. How likely is it that the fifth toss will also be a head?</p> <p>Mark the correct answer with a tick (✓).</p> <ul style="list-style-type: none"> <input type="checkbox"/> A. Almost certain <input type="checkbox"/> B. Very likely <input type="checkbox"/> C. As likely as getting a tail <input type="checkbox"/> D. Very unlikely 	
<p>20 In the year 2003, the first day of June fell on a Sunday. What day of the week was it on the 1st July 2003?</p> <p style="text-align: right;">Ans _____</p>	

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD
UNIVERSITY OF MALTA, MSIDA

SECONDARY EDUCATION CERTIFICATE LEVEL

MAY 2016 SESSION

SUBJECT:	Mathematics
PAPER NUMBER:	I – Section B (Calculator Section)
DATE:	30 th April 2016
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.

<i>For Office Use Only</i>												
Sec A	1	2	3	4	5	6	7	8	9	10	11	Total

1 Solve the following equations:

(i) $3x + 5 = 4x - 7$

2 marks

(ii) $\frac{4x+1}{5} = 7$

3 marks

2 A cardigan costs €7 more than a shirt.
Joanna bought 3 shirts and 2 cardigans for €129.
Work out the cost of a shirt and the cost of a cardigan.

4 marks

3 In a supermarket, the same type of fizzy drink is sold in three different ways.

Offer 1: two 1.5 litre bottles at €3.55

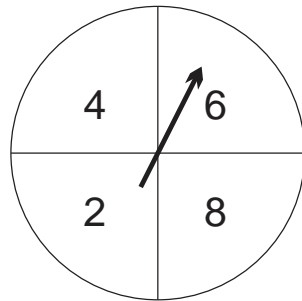
Offer 2: 8 half litre bottles at €5.60

Offer 3: 330 ml cans at 42c each

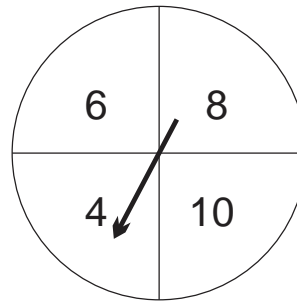
Which offer gives the best value for money? Explain your answer.

6 marks

- 4** The diagram shows two spinners, **X** and **Y**.
 Adrian spins both spinners. He then finds the total score by adding the number shown by the pointer on each spinner. The pointer on each spinner is equally likely to fall on each of the four sectors of its spinner.



Spinner X



Spinner Y

- (i) Using the table below, place a tick (✓) in the appropriate cell to show which of the listed events are certain, possible or impossible.

	Certain	Possible	Impossible
The total score will be more than 10			
The total score will be an even number			
The total score will be less than 6			
The score on spinner X will be greater than that on spinner Y.			

4 marks

- (ii) List all the possible outcomes when Adrian spins the two spinners. Three outcomes have already been done for you.

		Spinner X			
		2	4	6	8
Spinner Y	4	(2 , 4)	(4 , 4)		
	6	(2 , 6)			
	8				
	10				

2 marks

(iii) Which total score is most likely?

2 marks

(iv) Work out the probability that Adrian gets the most likely total score.

2 marks

- 5 A piece of wood in the shape of a square of side 50 cm has uniform thickness. Two circular pieces of radius 8 cm are to be cut out from the square piece as shown in the diagram.

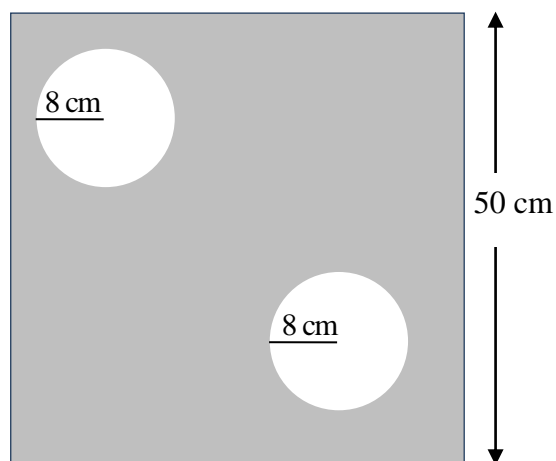


Diagram not drawn to scale

- (i) Calculate the total area of the two circular pieces cut out from the square.

2 marks

- (ii) The weight of the wooden square before cutting out the circular pieces is 2.80 kg. Calculate the weight of the remaining wood when the circular pieces are removed. Give your answer in kg correct to 2 decimal places.

4 marks

- 6 The angle of elevation of the top of a tower T from a point A on level ground is 80° .
The height of the tower is 40 m.

(i) Work out the distance AX.

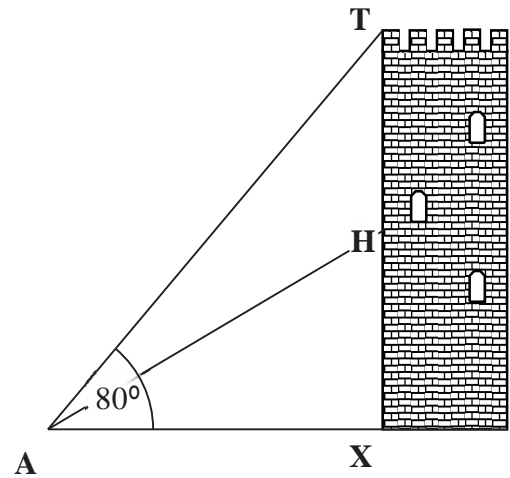


Diagram not drawn to scale

(ii) Determine the angle of elevation of the point H, half-way up the tower.

3 marks

(iii) Work out the distance AH.

3 marks

3 marks

-
- 7 The diagram shows the position of three palm trees, A, B and C in a garden. The diagram is drawn to scale.



- (i) Use the diagram to construct the locus of points which are equidistant from trees A and B. **2 marks**
- (ii) On the same diagram, construct the locus of points which are equidistant from trees A and C. **2 marks**
- (iii) Name the point where the two loci obtained in the previous parts of the question meet as P. Explain why P is equidistant from all three points A, B and C. **2 marks**
- (iv) Draw a circle passing through all three points A, B and C and measure the radius of this circle. **3 marks**

3 marks

8 A company imports 100 television sets from Japan at the beginning of the year.
Each set costs 30200 Japanese Yen (JPY).

(i) Calculate the cost of one television set in Euro if €1 = 132 JPY.

2 marks

(ii) The selling price for each television set is worked out to give a profit of 25%.
This price is then rounded to the nearest Euro.

By the end of June, the company sells 64 television sets.

Calculate the income from sales made by the end of June.

3 marks

(iii) The rest of the television sets are sold at a lower profit.

The total profit from the sale of all 100 television sets is €4965.

Calculate the profit made on **one television set** sold after June.

3 marks

- 9 The figure shows two triangles ABC and XYZ such that $\angle A = \angle Z$ and $\angle B = \angle Y$ as shown in the diagram.

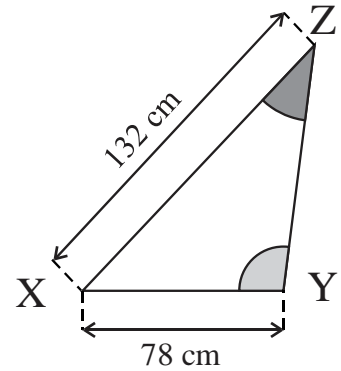
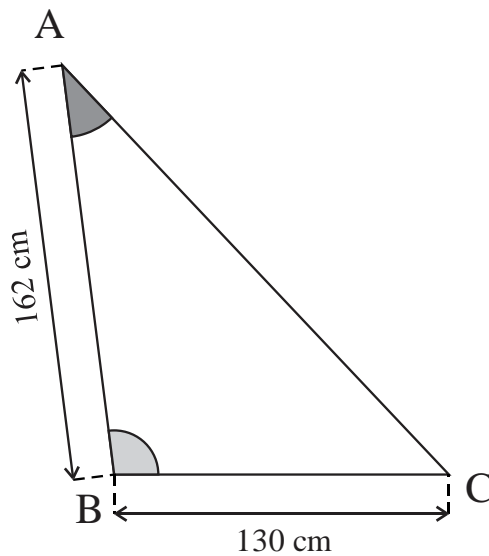


Diagram not drawn to scale

- (i) Explain why the two triangles are similar but not congruent.

2 marks

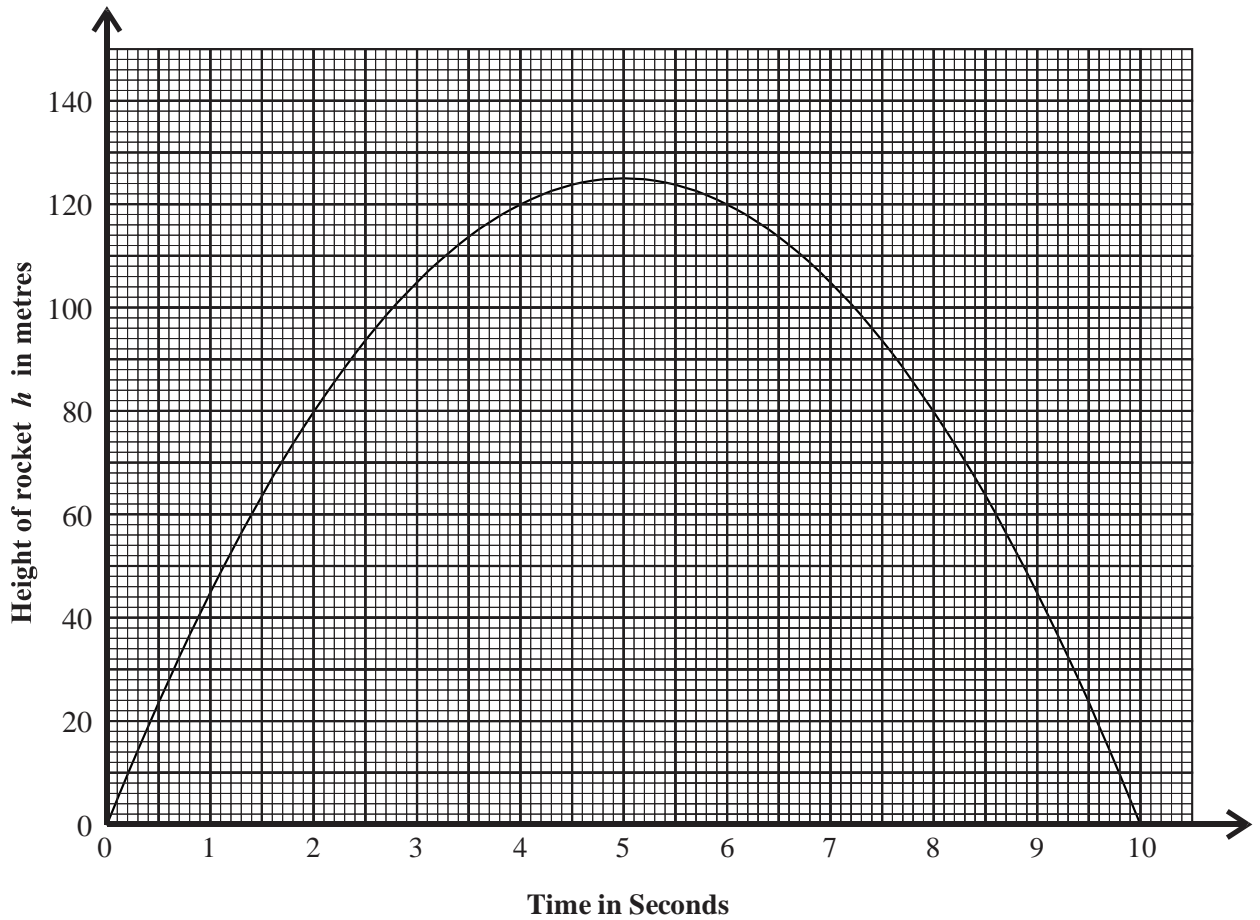
- (ii) In triangle ABC, work out the length of the side AC.

3 marks

- (iii) In triangle XYZ, work out the length of the side YZ.

2 marks

- 10** A rocket is fired into the air at time $t = 0$. The graph shows how the height h of the rocket above the ground changes between $t = 0$ and $t = 10$ seconds.



- (i) For what values of t is the rocket exactly 80 m above the ground?

2 marks

- (ii) During what time interval is the rocket going up?

1 mark

- (iii) For what value of t is the rocket at its highest position above the ground? How high above the ground is the rocket in this position?

2 marks

(iv) Here are three equations connecting h and t .

$$h = t^2 + 50$$

$$h = 50t - 5t^2$$

$$h = 125t$$

Determine which ONE of the above equations can be used to describe the height of the rocket from the time it is fired till 10 seconds later.

Write down this equation and explain why you chose this equation.

- 11** Maria has a sweet shop.
She buys 3 kg almond biscuits at €12.50 per kg, 4.5 kg chocolate biscuits at €11.20 per kg and 2.5 kg ginger biscuits at €9.80 per kg.
Maria also buys plastic trays in two sizes: the smaller ones cost 35c each and the bigger ones cost 40c each.

Maria mixes all the biscuits bought. She prepares 10 small trays each holding 200 g of biscuits. She divides the rest of the biscuits, equally by weight, in 16 bigger trays.

- (i) What is the weight of the biscuits in each of the bigger trays?

3 marks

- (ii) Maria sells all her biscuit-filled trays. She sells the small trays at €3.50 each and the bigger trays at €8.00 each. How much profit did Maria make?

4 marks

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD
UNIVERSITY OF MALTA, MSIDA

SECONDARY EDUCATION CERTIFICATE LEVEL

MAY 2016 SESSION

SUBJECT:	Mathematics
PAPER NUMBER:	IIA
DATE:	30 th April 2016
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.

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This paper carries a total of 100 marks.

Table of formulae

Area of triangle	$\frac{1}{2} ab \sin C$
Curved Surface Area of Right Circular Cone	$\pi r l$
Surface Area of a Sphere	$4 \pi r^2$
Volume of a Pyramid / Right Circular Cone	$\frac{1}{3} \text{base area} \times \text{perpendicular height}$
Volume of a Sphere	$\frac{4}{3} \pi r^3$
Solutions of the equation $ax^2 + bx + c = 0$	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
Sine Formula	$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$
Cosine Formula	$a^2 = b^2 + c^2 - 2bc \cos A$

<i>For Office Use Only</i>											
1	2	3	4	5	6	7	8	9	10	11	Total

1 (a) Solve the equation $\frac{x+8}{x} = x + 3$.

3 marks

(b) Solve the equation $(2x + 3)(x - 5)(x + 1) = 0$

3 marks

(c) Factorise $2x^2 - 3x - 5$.

2 marks

2 (a) Work out the value of $343^{-\frac{2}{3}}$.
Give your answer in the form $\frac{1}{n}$, where n is an integer.

2 marks

(b) (i) Expand and simplify the expression $(2a - 3)(2a + 3)$.

2 marks

(ii) Use your result in part 2b(i) to work out the value of $(2\sqrt{7} - 3)(2\sqrt{7} + 3)$. Show your working.

2 marks

- 3** (a) x is proportional to the square of y .
When $x = 54$, then $y = 3$.

(i) Work out the value of x when $y = 4.5$.

3 marks

(ii) Work out the value of y when $x = 486$.

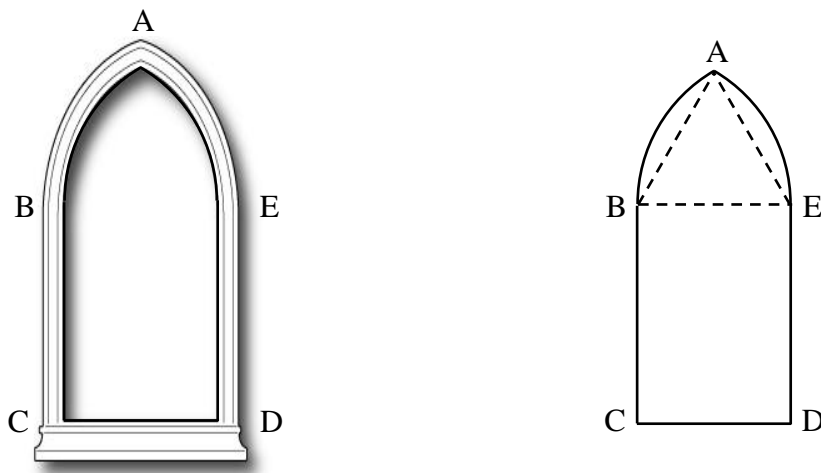
3 marks

- (b) Stefan takes 30 minutes to paint a rectangular wall. If he works at the same rate, how long does it take him to paint another wall which is **twice** as long and **one and a half times** as wide?

4 marks

- 4 The window shown on the left in the diagram below has the shape of a pointed arch. The whole shape $ABCDE$ on the right is the glass window pane. The lines AB , BE and EA are just construction lines.

Point E is the centre of a circular arc AB . Point B is the centre of the circular arc AE . BC is 1.20 m and CD is 82 cm long.



- (i) Show that $\angle ABE = 60^\circ$.

3 marks

- (ii) Calculate, giving your answer in metres:

- (a) the length of the arc AB ;

2 marks

- (b) the perimeter of the window pane $ABCDE$;

2 marks

-
- (c) the height of the window pane (from A to CD).

3 marks

-
- 5 (a) A wine barrel holds 225 litres to the nearest litre and a wine bottle holds 750 ml to the nearest 10 ml.

Jo empties a barrel into wine bottles and she does not spill any of the wine. What is the least number of bottles she is sure to fill completely?

4 marks

- (b) How many fractions can you find between $\frac{1}{2}$ and 1? Explain your answer.

3 marks

- (c) Solve the following inequalities:

(i) $\frac{2}{3}x + 5 < 39$

2 marks

(ii) $5 - 3x \leq 38$

2 marks

- 6 The diagram represents the arm of a crane RST.

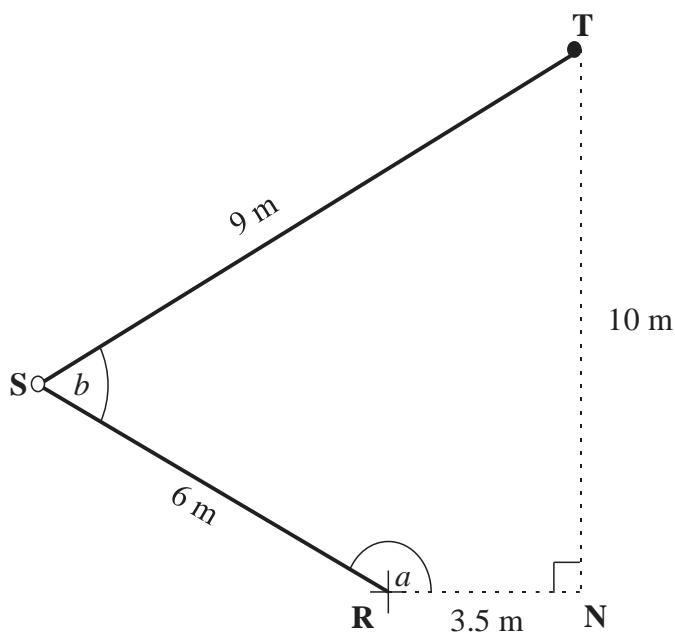


Diagram not drawn to scale

The arm moves in a vertical plane by changing the angles a and b .

Point R is fixed and the arms RS and ST of the crane are 6 m and 9 m long respectively.

The crane is shown reaching a point T that is 3.5 m to the right of R and 10 m higher than R.

For this position of the crane:

- (i) Calculate the distance RT.

3 marks

- (ii) Determine the angle of elevation of T from R.

3 marks

(iii) Determine the values of angles a and b when the crane tip is in the position T.

6 marks

7 Solve the following simultaneous equations:

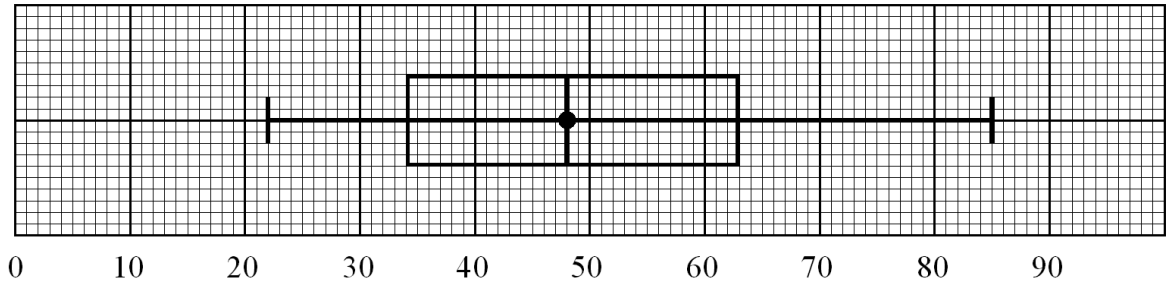
$$y = 2x - 2$$

$$2y^2 = 4x^2 + 1$$

6 marks

8 A company collected information about the lifetime of two types of car batteries: battery Type A and battery Type B.

(i) The boxplot below shows information about the lifetime in months of 100 batteries of type A.



For Type A batteries, use this boxplot to determine:

- (a) the median lifetime _____
- (b) the interquartile range of the lifetime for these batteries _____

2 marks

(ii) This table shows information about the time in months that 50 batteries of Type B lasted.

Time (t months)	Frequency Battery B
$30 \leq t < 40$	3
$40 \leq t < 50$	11
$50 \leq t < 60$	19
$60 \leq t < 70$	13
$70 \leq t < 80$	4

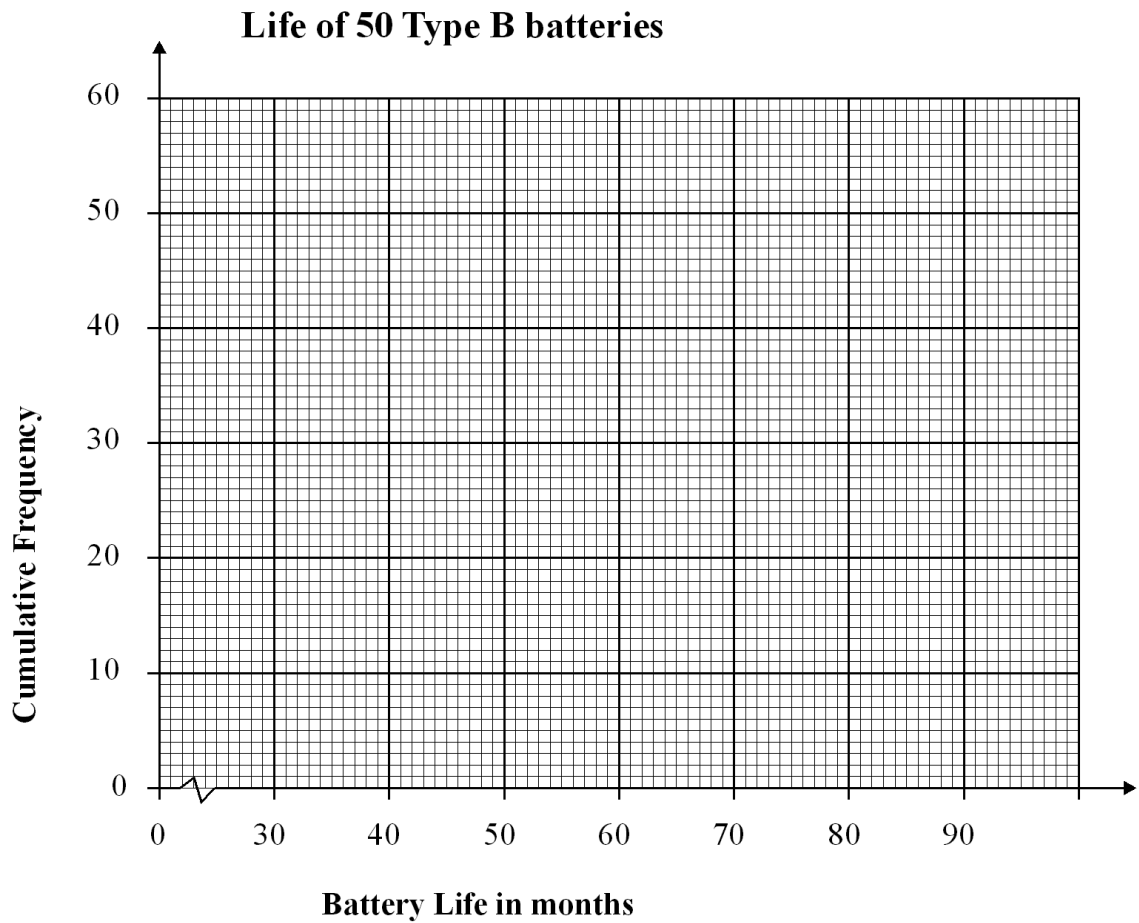
Complete the cumulative frequency table for battery Type B.

Number of months (t)	Cumulative frequency Battery B
$0 < t \leq 30$	
$0 < t \leq 40$	
$0 < t \leq 50$	
$0 < t \leq 60$	
$0 < t \leq 70$	
$0 < t \leq 80$	

3 marks

DO NOT WRITE ABOVE THIS LINE

- (iii) Using the table produced in part (ii), draw a cumulative frequency graph for the Type B batteries on grid below.



3 marks

- (iv) Use the cumulative frequency curve to determine the median, and the interquartile range for Type B batteries.

2 marks

- (v) Use your results of part (i) and part (iv) above to explain which type of battery you would expect to last longer.

2 marks

- 9 A sector of a circle AOB has radius L and $\angle AOB$ is equal to x degrees.
The sector is folded into the cone as shown in the figure.

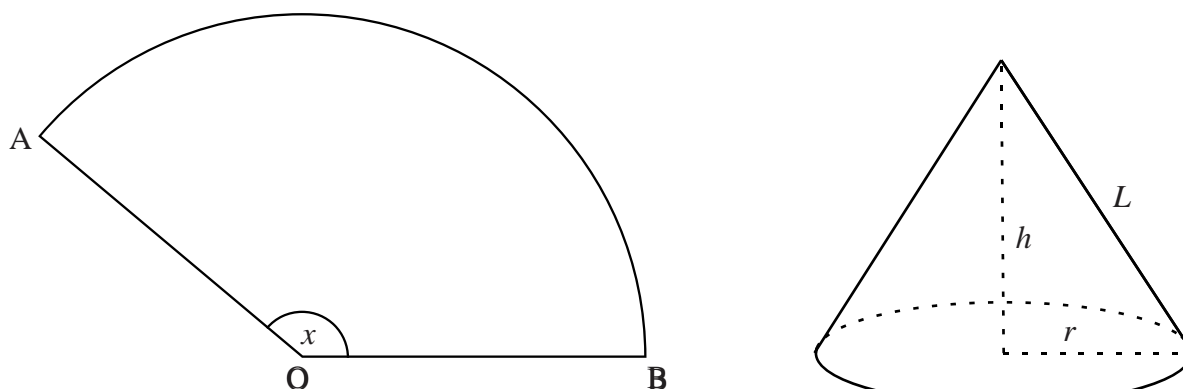


Diagram not drawn to scale

- (i) Determine the length of the arc AB of the sector **in terms of L and x** .

1 mark

- (ii) Write an expression for the perimeter of the circular base of the cone **in terms of r** .

1 mark

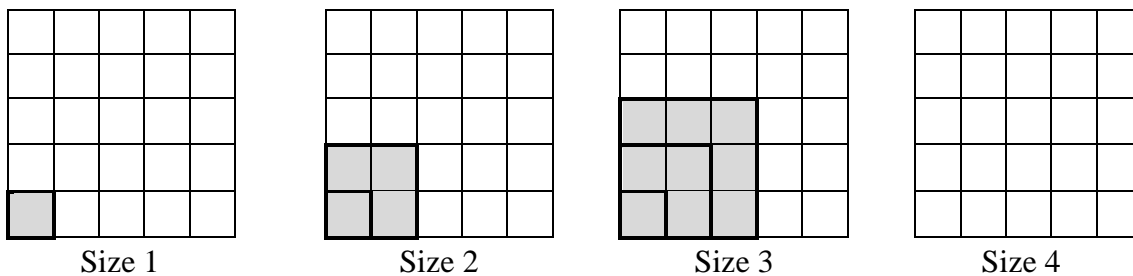
- (iii) Show that $x = \frac{r}{L} \times 360^\circ$.

2 marks

- (iv) Use the result in part (iii) to derive an equation for the curved surface area of the cone **in terms of r and L** .

3 marks

10 Jean uses squared paper to draw patterns with squares of different sizes.

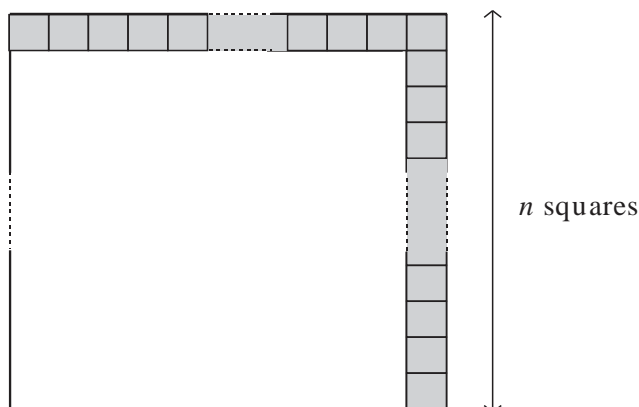


- (i) Use Jean's pattern to complete the shape for a square of size 4. **1 mark**
- (ii) Jean uses his drawings to divide the areas of the first three squares as follows. Break up the area of the square of size 4 in the same way.

Size 1	$1 = 1$
Size 2	$4 = 1 + 3$
Size 3	$9 = 1 + 3 + 5$
Size 4	_____

1 mark

- (iii) Kate is using Jean's pattern to see what happens with large squares of different sizes. She draws the following figure to show the last subdivision of the square of size n .



Square of size n

Write in terms of n :

- (a) the total number of squares inside the square of size n ;
- (b) the number of squares that the shaded area in the diagram above contains.

1 mark

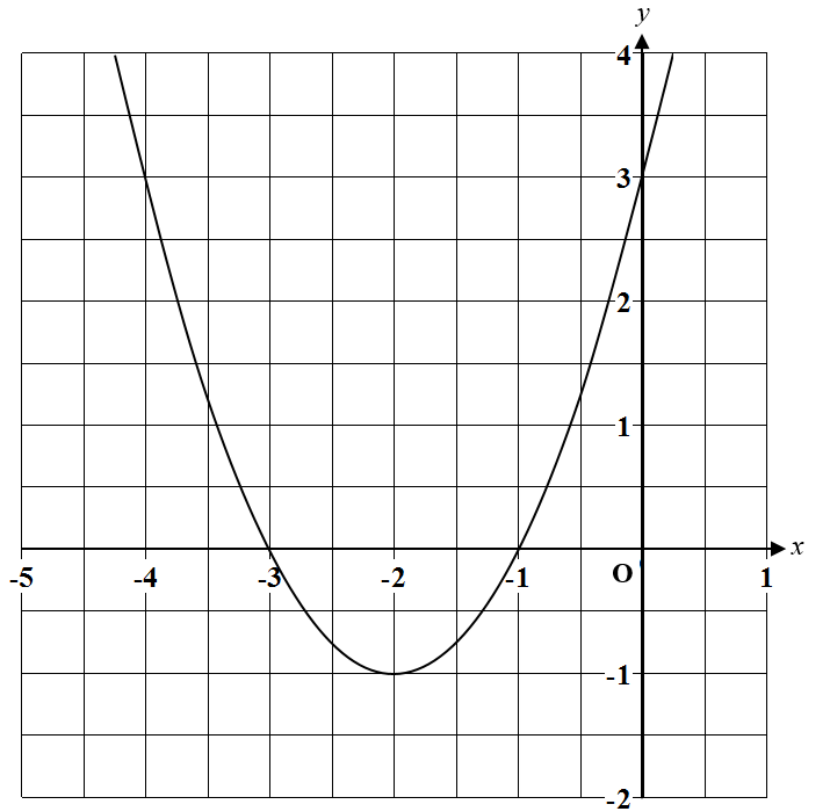
2 marks

- (iv) Use your previous results to write 81 as the sum of consecutive odd numbers.

3 marks

- 11** Four students are studying the graphs of functions of the form $y = x^2 + 4x + k$. Each student takes a different value of k , where k is a whole number and draws the graph of the function.

Angela uses $k = 3$ and plots the graph of $y = x^2 + 4x + 3$ which is shown here.



- (i) Use the graph to solve the equation $x^2 + 4x + 3 = 0$.

2 marks

- (ii) Brigitte's graph passes through the point $(-2, 1)$. Find the value of k for this graph.

2 marks

- (iii) On Carl's graph, the curve cuts the x -axis at the points $x = -6$ and $x = 2$. Find the value of k that he used.

3 marks

- (iv) Daniel's graph meets the x -axis only once. Find the value of k that Daniel used.

3 marks

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE EXAMINATIONS BOARD
UNIVERSITY OF MALTA, MSIDA

SECONDARY EDUCATION CERTIFICATE LEVEL

MAY 2016 SESSION

SUBJECT:	Mathematics
PAPER NUMBER:	IIB
DATE:	30 th April 2016
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.

<i>For Office Use Only</i>											
Question No	1	2	3	4	5	6	7	8	9	10	11
Mark											
Question No	12	13	14	15	16	17	18	19	20	21	
Mark											
										Total Mark	

1 Complete the following statements:

- (i) 3.72 litres = _____ millilitres
- (ii) 3.5 centimetres = _____ millimetres
- (iii) 100 grams = _____ kilogram
- (iv) 1.5 hours = _____ minutes
- (v) 7.5 kilometres = _____ centimetres
- (vi) 5 litres 75 millilitres = _____ litres

6 marks

2 Solve the equations below:

(i) $10a = 3a + 21$

2 marks

(ii) $7(b - 10) = 2(4 - 3b)$

3 marks

3 On Monday Katya bought 44 pens each costing 50c.

On Friday, the cost of the pens increased to 55c each. At this price, how many can she buy for the same amount of money she spent on Monday?

3 marks

4 The pictures shows a thermometer which reads values between 0°C and 100°C .

(i) What is the temperature shown on Figure A?

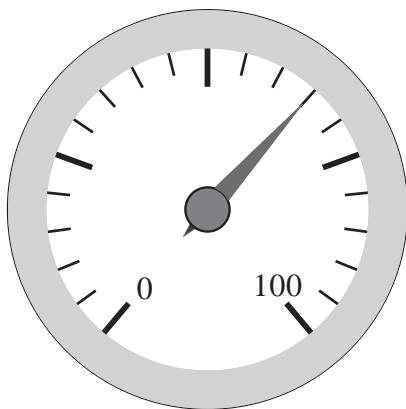


Figure A

2 marks

(ii) Using Figure B, mark the position of the pointer when the thermometer reads 35°C .

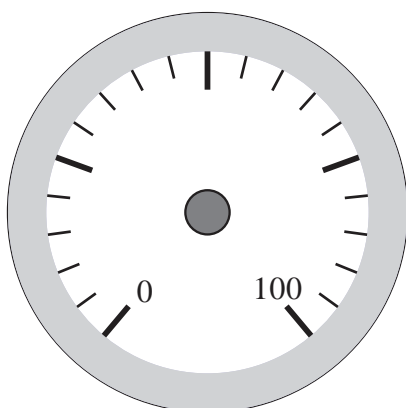


Figure B

1 mark

5 A distance of 16.25 m on the ground is represented by a length of 6.5 cm on a map. Determine the distance (in cm) on the ground represented by 1 cm on the map.

3 marks

6 Use your calculator to work out $\sqrt{\frac{7\pi}{5.532 \times 9.888}}$.

Give your answer to two decimal places.

2 marks

7 The total surface area A of a solid cylinder is given by $A = 2\pi r^2 + 2\pi rh$.

(i) Calculate A when $r = 3$ cm and $h = 7$ cm. Give your answer in terms of π .

3 marks

(ii) Make h the subject of the equation.

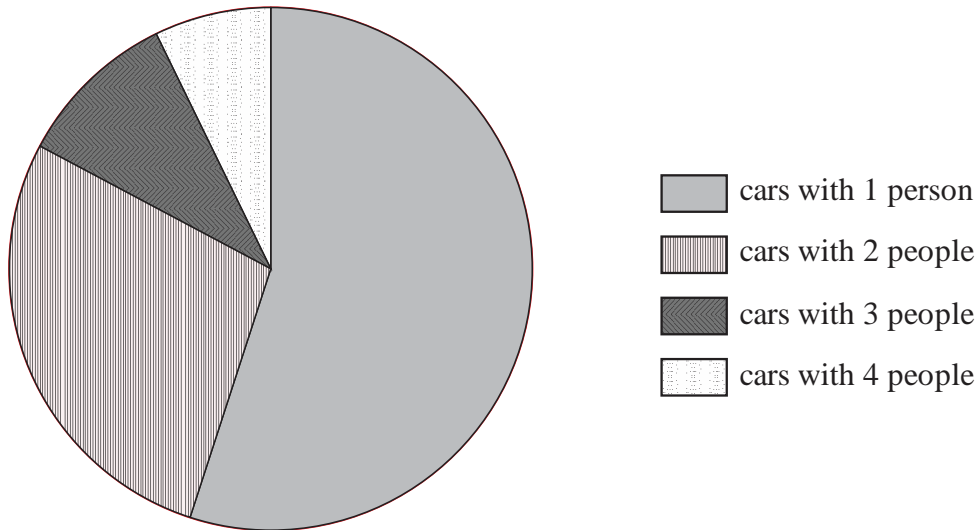
2 marks

8 The sum of €7000 is to be shared between Amy, Ben and Connie in the ratio 4:5:11.
How much will each of them receive? Show your working.

5 marks

- 9 A village council collects information about the number of travellers in cars leaving the village. The pie-chart gives information collected on Friday.

Cars



The council has a target that two or more people travel in more than 35% of the cars. Did the council meet its target on Friday? Show your working.

4 marks

-
- 10** Steve is on a holiday in London.
The exchange rate for the British Pound is £1 = €1.32.

- (i) Steve finds a coat costing £45.
In Malta the same coat costs €55.
Where is the coat cheaper and by how much?

3 marks

- (ii) Use this exchange rate to find the value of €100 in British Pound.

2 marks

-
- 11** The table shows the population of the five most highly inhabited countries on Earth.

Country	Population
Brazil	205,650,000
China	1,374,930,000
India	1,284,670,000
Indonesia	258,705,000
United States	322,875,000

- (i) Which of the above countries has the highest population?

1 mark

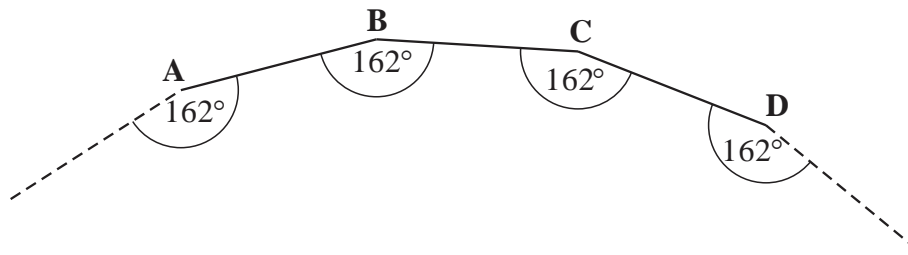
- (ii) What is the population of Brazil to the nearest million?

1 mark

- (iii) A billion is one thousand million. Which of the above countries has/have a population of more than one billion?

1 mark

- 12** The diagram shows part of a regular polygon. Each interior angle is 162° . A, B, C and D are adjacent vertices on this polygon.



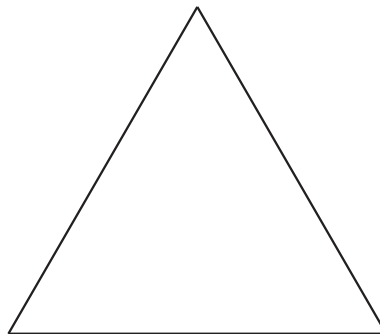
- (i) Calculate the number of sides of the polygon.

3 marks

- (ii) Work out the size of $\angle BAC$.

3 marks

- 13** The diagram shows an equilateral triangle.
Draw all its lines of reflective symmetry.



2 marks

14 (i) In January, Sandra downloaded the following songs from the internet.


Pop	24
Hip-hop	12
Rock	18
Total	54




Complete the table below to draw a pictograph which represents this data.

Use the symbol  to represent 4 songs.

Songs downloaded in January	
Pop	
Hip-Hop	
Rock	

2 marks

(ii) The pictograph below represents the songs Sandra downloaded during the month of February. The symbol  is used to represent two songs.

Songs downloaded in February	
Pop	
Hip-Hop	
Rock	

What percentage of all the songs downloaded by Sandra in January and February are Hip-Hop? Give your answer to 1 decimal place.

4 marks

- 15 The two pillars below are made from cylinders and cuboids. All the cylinders are of the same size and so are all the cuboids.

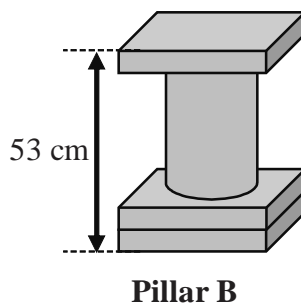
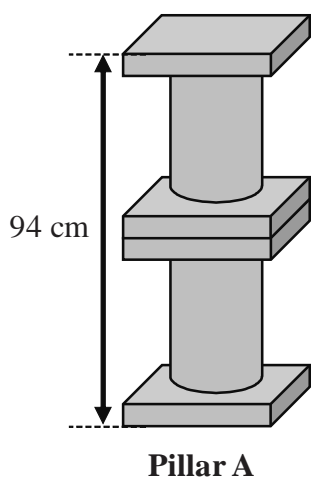


Diagram not drawn to scale

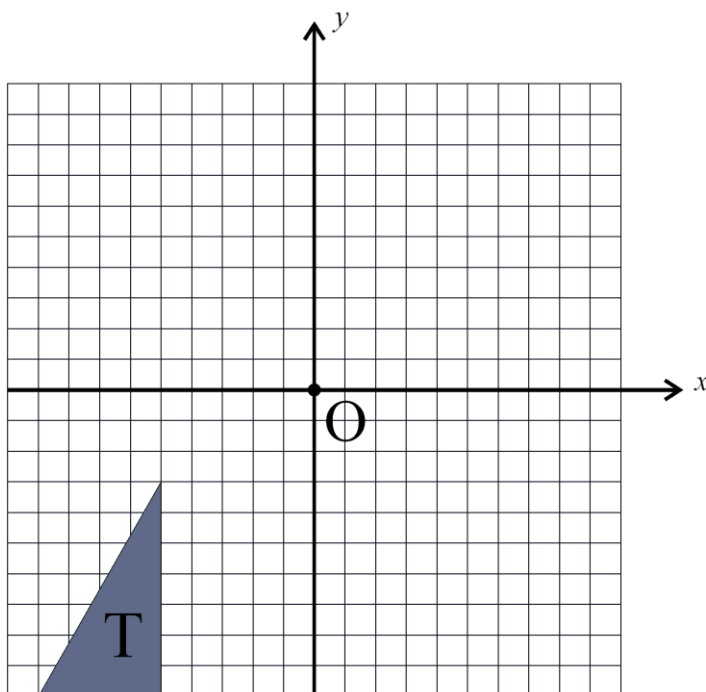
- (i) If the height of each cylinder is x cm and the height of each cuboid is y cm, write two equations that x and y satisfy.

2 marks

- (ii) Determine the height of a cylinder and the height of a cuboid.

4 marks

16



On the grid above:

- (i) Draw a reflection of triangle T in the x -axis. Label the image as A. **1 mark**
- (ii) Draw a rotation of triangle T by 180° about O. Label the image as B. **1 mark**
- (iii) Draw a rotation of triangle T by 90° anticlockwise about O. Label the image as C. **2 marks**
- (iv) Describe fully the transformation that maps triangle B onto triangle C **2 marks**

2 marks

- 17 P, Q, R and S are four points on the circumference of a circle centre O.
Angle SPQ is 65° and angle PQO is 30° .

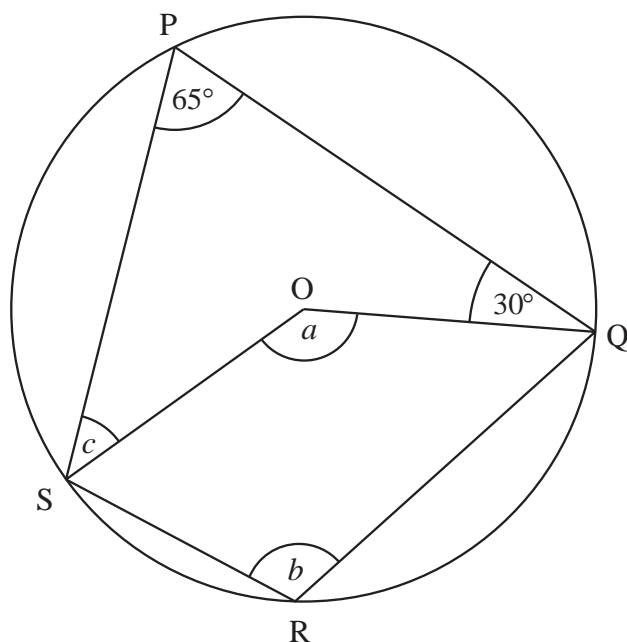


Diagram not drawn to scale

- (i) Determine the size of the angles marked as follows. Explain your answers.

(a) a

2 marks

(b) b

2 marks

(c) c

3 marks

18 Carole has a bonus card that gives her a reduction of 15% on any purchase at a stationery.

- (i) Carole presented her bonus card when her bill amounted to €17.40. How much money did Carole pay?

3 marks

- (ii) On another occasion, Carole paid €27.20 when the discount was deducted. What was her bill before discount was deducted?

4 marks

19 ABCD is a quadrilateral.

The interior angles, in degrees, are such that $\angle A = x$, $\angle B = x + 20$, $\angle C = x + 30$ and $\angle D = x + 50$

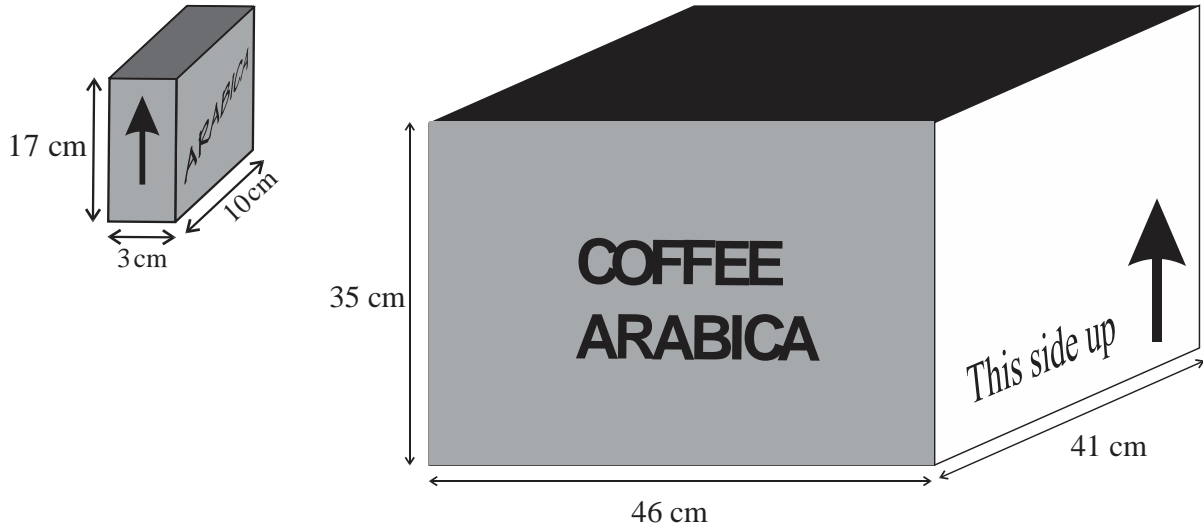
- (i) Find the value of x .

3 marks

- (ii) Show that ABCD is a trapezium, indicating clearly the parallel sides.

4 marks

- 20** The large box is to be filled with packets of coffee.
 Each packet of coffee measures 3 cm by 10 cm by 17 cm.
 The large box measures 46 cm by 41 cm by 35 cm.



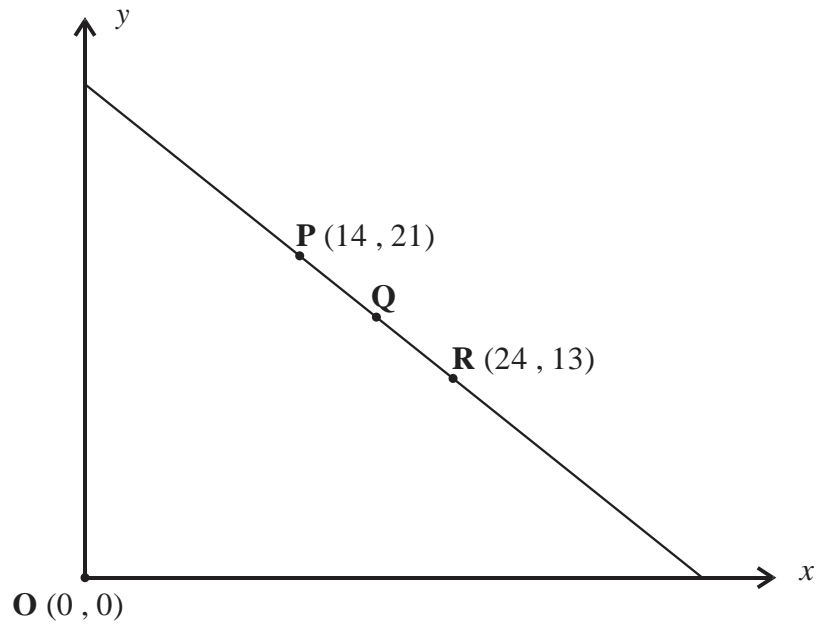
- (i) The coffee packets are to be fitted upright, as shown by the arrows, in the large box. How many packets of coffee can be fitted in a layer over the base of the large box? Show your working.

3 marks

- (ii) How many packets of coffee can be fitted into the large box? Show your working.

2 marks

21 The points P, Q and R lie on a straight line graph.



- (i) Point Q lies in the middle of PR.
What are the co-ordinates of Q?

2 marks

- (ii) Join OP. Determine the equation of line OP.

2 marks

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