L-Università ta' Malta

MATRICULATION AND SECONDARY EDUCATION
CERTIFICATE EXAMINATIONS BOARD

**SECONDARY EDUCATION CERTIFICATE LEVEL
2018 SUPPLEMENTARY SESSION**

SUBJECT:	**Mathematics**	PAPER:	I – Section A (Non-Calculator Section)
DATE:	1st September 2018	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.
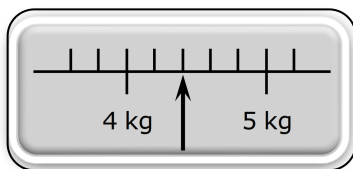This paper carries a total of 20 marks.

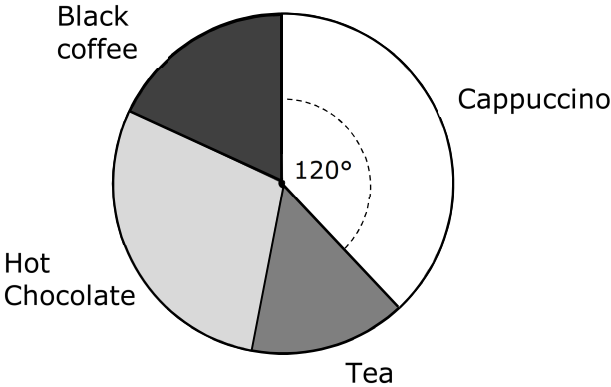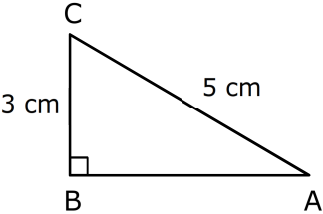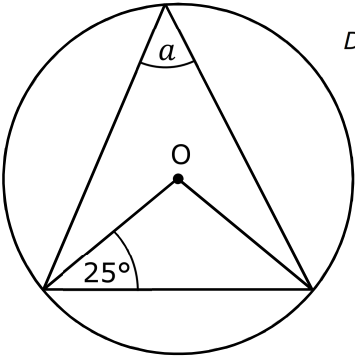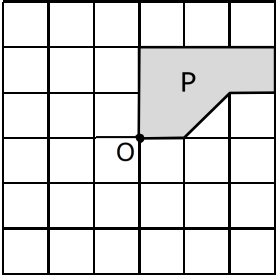| QUESTIONS AND ANSWERS ALL QUESTIONS CARRY ONE MARK	SPACE FOR ROUGH WORK (IF NECESSARY)

1   Write in figures the number:
 	
     Five thousand six hundred and twenty
 	
     Ans _____	

2   The scales below shows the weight of a baby.
   Write the weight of the baby in kilograms.
 	
4 kg   5 kg
 	
     Ans _____	

3 Work out: $$\frac{2}{3} + \frac{3}{5} + \frac{11}{15}$$ **Ans** _____	
4 Solve for x: $2x + 3 = 8$ **Ans** _____	
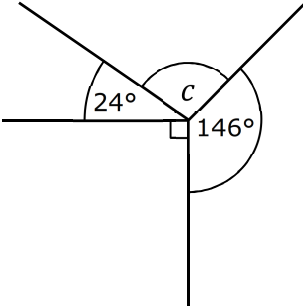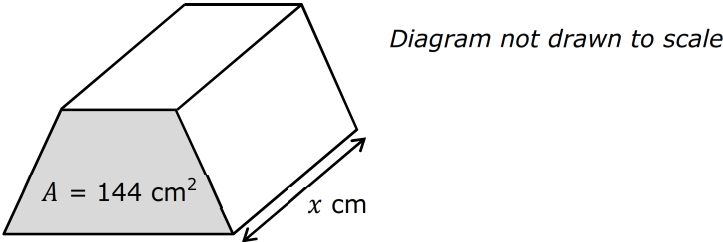
5   Find the mean of the following set of numbers:
 	
    22, 26, 34, 38
 	
     Ans _____	

QUESTIONS AND ANSWERS ALL QUESTIONS CARRY ONE MARK	SPACE FOR ROUGH WORK (IF NECESSARY)
6 Sam has 5 green marbles, 4 blue marbles, 1 red marble and 2 yellow marbles. What is the probability that a marble picked at random is blue? Ans _____	
7 On one winter day in Munich, the maximum temperature was 8°C and the minimum temperature was –5°C. Calculate the difference between the two temperatures. Ans _____	
8 A regular hexagon has a perimeter of length 25.2 cm. Find the length of one of the sides. Ans _____	
9 Find the value of the angle marked c. *Diagram not drawn to scale* 24° c 146° Ans _____	
10 Simplify: $$\frac{18a^2b^3}{6ab^2}$$ Ans _____	
11 Which one of the following points lies on the line $y = 4x + 3$? A(–1, –7) B(–2, –5) C(3, 12) Ans _____	

QUESTIONS AND ANSWERS ALL QUESTIONS CARRY ONE MARK	SPACE FOR ROUGH WORK (IF Necessary)
12 The nth term of a sequence is $n^2 - 11$. Calculate the 9th term. **Ans** _____	
13 A solid metal bar has a volume of 2880 cm^3. It has a uniform cross-sectional area of 144 cm^2. Calculate the length x of the bar. *Diagram not drawn to scale* $A = 144$ cm^2 x cm **Ans** _____	
14 By rounding each of these numbers to the nearest whole number, estimate the value of: $$\frac{70.12 \times 24.87}{4.79}$$ **Ans** _____	
15 One exterior angle of a regular polygon is 24°. How many sides does the polygon have? **Ans** _____	
16 The pie chart represents the favourite warm drinks of 72 people at an office. How many people prefer Cappuccino? Black coffee Cappuccino 120° Hot Chocolate Tea **Ans** _____	

QUESTIONS AND ANSWERS ALL QUESTIONS CARRY ONE MARK	SPACE FOR ROUGH WORK (IF NECESSARY)
17 Work out: (37 × 4) + (13 × 4) **Ans** _____	
18 Find the value of Cos A in triangle ABC. C *Diagram not drawn to scale* 5 cm 3 cm B A **Ans** _____	
19 The diagram below shows a circle centre O. Calculate the value of the angle marked a. a *Diagram not drawn to scale* O 25° **Ans** _____	
20 Shape P is rotated by 90° anticlockwise about point O. On the grid below draw the image of P. P O	

MATRICULATION AND SECONDARY EDUCATION CERTIFICATE
EXAMINATIONS BOARD

**SECONDARY EDUCATION CERTIFICATE LEVEL
2018 SUPPLEMENTARY SESSION**

SUBJECT:	**Mathematics**
PAPER NUMBER:	I – Section B (Calculator Section)
DATE:	1st September 2018
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.

For Office Use Only												
Sec A	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**Total**

1   (a)   Fill in the missing readings on the scale.

-1   0   1
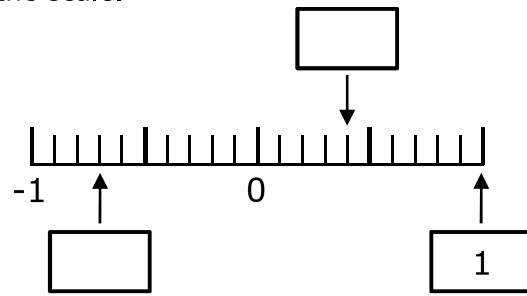
(2)

(b)   Fill in each cell with one possible value.

	Greater than 5	Factor of 12
Even number		
Square Number		
Prime Number		

(6)

(Total: 8 marks)

2   In the diagram, triangle ABC is isosceles with AB = AC.
     BÂC = 42°. Triangle ADB is isosceles with AD = BD.
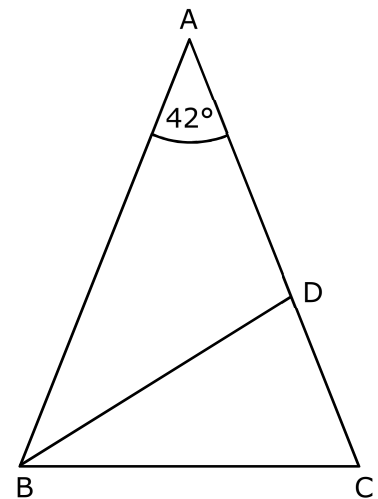
Calculate the size of the following angles:

(a) AD̂B

Diagram not drawn to scale

(2)

(b) DB̂C

(3)

(Total: 5 marks)

3   A couple wants to book a holiday for a week in Prague.
     The following two tour operators offer the same holiday packages.

Ċikku Tours (per person)	
Flight and full board accommodation	€370
Excursion Package	€120

Online Express (per person)	
Flight	€152
Full board accommodation	€275
Excursion Package	€98

(a)   Ċikku Tours offers an overall 10% discount on early bookings.
       Work out the total cost of the holiday for the couple if they book early.

(4)

(b)   Online Express is offering one free excursion package per couple.
       Calculate the total cost of the holiday if the couple book the holiday at Online Express.

(4)

(c)   Which is the cheaper option and by how much?

(2)

(Total: 10 marks)

4   (a)   A theatre presented a show five times. The attendance at the shows was as follows:

635,   550,   710,   600,   720

(i)   Work out the mean of these attendances.

(2)

(ii)   What is the median of these attendances?

(2)

(iii)   What is the range of these attendances?

(2)

(b)   For one show, the theatre sold the following tickets:

Type of Ticket	Price per Ticket	Number of Tickets
Premium Gold	€25	103
Premium Silver	€20	240
Gallery	€15	154
Student	€12	223

(i)   Work out the number of tickets sold for this show.

(1)

(ii)   Calculate the total amount of money collected by the theatre for these tickets.

(2)

(iii)   Calculate the mean price of a ticket.

(2)

(Total: 11 marks)

5   Giorgio is clearing up cutlery in his houseware shop.

(a)   The ratio of the number of knives to the number of forks is 5 : 4.
       The total number of knives and forks in the shop is 189.
       Calculate the number of forks Giorgio has in his shop.

(3)

(b)   Giorgio notices that:

- the number of knives to the number of forks is 5 : 4
- the number of forks to the number of spoons is 3 : 2

Write down the ratio of knives : forks : spoons.

(3)

(Total: 6 marks)

6   Rita leaves from point A and drives 10 km due East to a point B.
     She then drives 10 km due South to a point C.

     (a)   Let 1 cm represent 2 km to construct a scale diagram for Rita's journey.

                                                                              (3)
     (b)   What is the bearing of C from A?

                                                                              (1)

     From point C, Rita drives a distance of 6 km due South West to a point D.

     (c)   Find the actual distance between point D and point A.

                                                                              (3)

     (d)   What is the bearing of D from A?

                                                                              (1)

                                                          (Total: 8 marks)

7   At a greengrocer, apples cost a euro per kilogram and bananas cost b euro per kilogram.

(a)   Peter buys 3 kg of apples and 2 kg of bananas. He spends €9.80 on these items.
Write down an equation to represent this in terms of a and b.

(1)

(b)   Jane buys 2 kg of apples and 5 kg of bananas at the total cost of €12.40.
Write down another equation involving a and b.

(1)

(c)   Solve these two equations to find the cost of 1 kg of apples and the cost of 1 kg of bananas.

(4)

(Total: 6 marks)

8   Daniela bought a car for €8000.
     The value of the car depreciated by 8% in the first year.
     The value of the car depreciated by 10% in the second year.

     (a)   Calculate the value of Daniela's car after 1 year.

                                                                                    (2)

     (b)   Daniela says:

                "8 + 10 = 18, so in two years the value of my car depreciated by 18%"

            Is Daniela correct? Explain your reasoning.

                                                                                    (4)

                                                                    (Total: 6 marks)

9 (a) Draw a pentagon ABCDE. Draw the lines AC and AD.
        Use your diagram to show that the interior angles of a pentagon add up to 540°.

(2)

   (b) Draw a hexagon and similarly determine the sum of its interior angles.

(2)

   (c) Other polygons may be divided in a similar way. Fill in the table below to deduce a
        formula for the sum of the interior angles of a polygon with n sides.

Number of sides	Number of triangles	Sum of interior angles
4	2	360°
5		
6		
7		
n		

(4)

(Total: 8 marks)
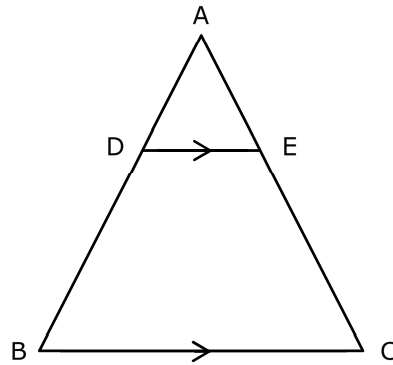
10   In triangle ABC, DE is parallel to BC.

Diagram not drawn to scale

(a)   Show that triangle ADE is similar to triangle ABC.

(3)

(b)   Given that AD = 2.4 cm, DE = 3 cm and BC = 10 cm, calculate the length of AB.

(2)

(Total: 5 marks)

11   The diagram shows a pentagon ABCDE with $B\hat{C}D = C\hat{D}E = 90°$.
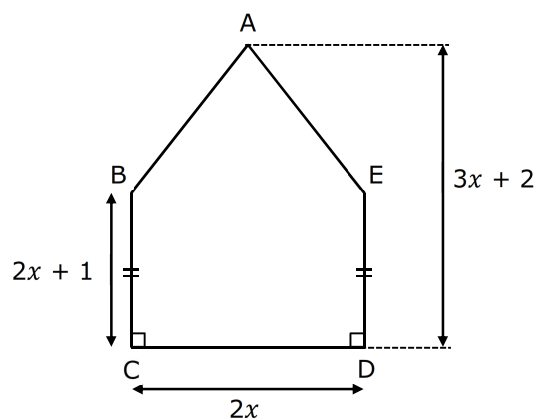   BC = ED = $2x + 1$ and CD = $2x$. The height of A from CD is $3x + 2$.

Diagram not drawn to scale

(a)   Find the height of triangle ABE in terms of x.

(2)

(b)   Find the area of triangle ABE in terms of x.

(2)

(c)   Show that the area of the pentagon ABCDE is $5x^2 + 3x$.

(3)

(Total: 7 marks)

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L-Università ta' Malta

SUBJECT:	**Mathematics**
PAPER NUMBER:	IIB
DATE:	1st September 2018
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.

For Office Use Only										
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   Write down the next term and the rule for finding the next term for the following sequences:

(a)   3, 9, 27, 81, _____   Rule:_____   (2)

(b)   0.3, 0.7, 1.1, 1.5, _____   Rule:_____   (2)

(c)   8, 2, $\frac{1}{2}$, $\frac{1}{8}$, _____   Rule:_____   (2)

(Total: 6 marks)

2   (a)   Work out $14 \times 4 - 24 \div 2$.

(2)

(b)   Find a number between 80 and 90 that is a multiple of both 3 and 7.
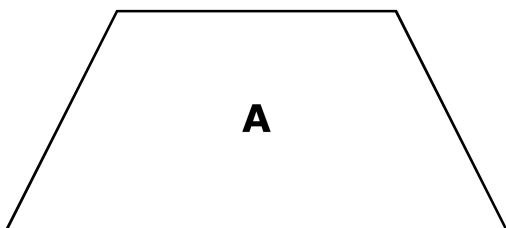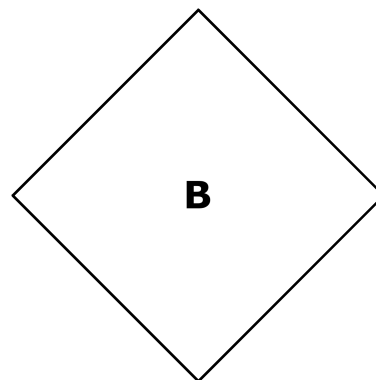
(2)

(Total: 4 marks)

3   Write the following in ascending order:

0.7, $\frac{2}{3}$,   three quarters,   55%

(Total: 3 marks)

4 (a) Draw all the lines of symmetry of quadrilaterals A and B.

(3)

(b) Shape B has rotational symmetry of order _____.

(1)

(Total: 4 marks)

5 Use $a = 2.5 \times 10^3$, $b = 3.1 \times 10^6$ and $c = 5.2 \times 10^{-9}$ to work out the following.
Give your answer in standard form.

(a) $a + b$

(2)

(b) $a^2 c$

(2)

(Total: 4 marks)

DO NOT WRITE ABOVE THIS LINE

6   Super Soft shower gel is available in two sizes.
     The small 250 ml bottle costs €2.35. The large 400 ml bottle costs €3.90.
     Which size is the better value for money? Explain your reasoning.

(Total: 3 marks)

7   (a)   Which of the following is equivalent to $7 + 7 + 7 + 7 + 7$?

            A 7^5

            B 5^7

            C 5×7

(1)

     (b)   Which of the following is equivalent to $a^2 \times a^2 \times a^2$?

            A $6a$

            B a^6

            C $3a^2$

(1)

     (c)   Which of the following is equivalent to $(x)(x)(x) + (x)(x)(x) + (x)(x)(x)$?

            A $9x$

            B $(3x)^3$

            C $3x^3$

(1)

(Total: 3 marks)

8 A bus leaves Valletta at 09:15 and arrives at Mellieħa at 10:05.
The distance between Valletta and Mellieħa is 24 km.
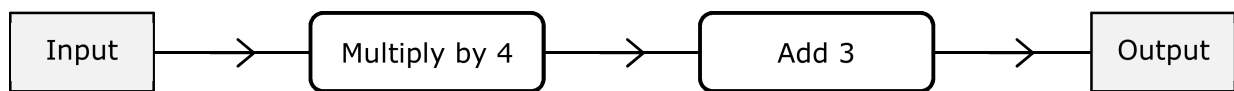
(a) Work out the time taken for the journey.

(2)

(b) Calculate the average speed of the bus in kilometres per hour.

(2)

(Total: 4 marks)

9

| Input | | Multiply by 4 | | Add 3 | | Output |

Use the number machine above to find:

(a) the value of the output when the input is 6;

(1)

(b) the output when the input is x;

(1)

(c) the value of the input when the output is 51.

(2)

(Total: 4 marks)

10   A bag contains some sweets.
      The sweets come in three flavours: mint, lime and strawberry.

      The table below shows the probability of choosing, at random, a sweet of a particular flavour.

Flavour	Mint	Lime	Strawberry
Probability	0.25	0.4	

(a) What is the probability that a sweet chosen at random from the bag is strawberry flavoured?

(3)

(b) The bag contains 60 sweets. How many of these are lime flavoured?

(2)

(Total: 5 marks)

11   (a)   For $A = \dfrac{h(a + b)}{2}$, find the value of A given that $h = 4$, $a = 3$ and $b = 9$.

(2)

(b)   Make h subject of the formula $A = \dfrac{h(a + b)}{2}$.

(2)

(Total: 4 marks)

12 Rhombus ABCD is such that diagonal AC = 16 cm and diagonal BD = 30 cm.
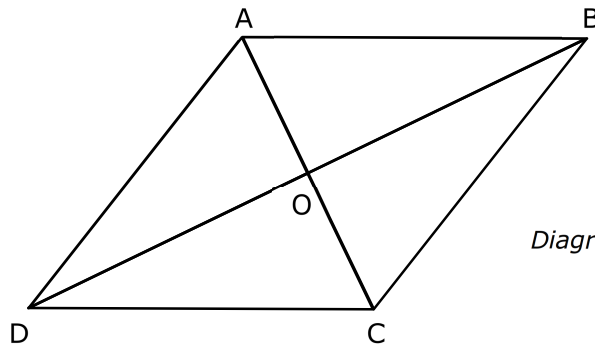The diagonals intersect at point O.

Diagram not drawn to scale

(a) What type of triangle is:

(i) triangle AOB _____

(ii) triangle ABC _____

(2)

(b) Calculate the length of one side of rhombus ABCD.

(3)

(Total: 5 marks)

13   Water from five taps, all flowing at the same rate, can fill a water tank in 27 minutes.
     If two taps are not used, how long would it take the other three taps to fill the same tank?

(Total: 3 marks)

14   (a)   Write down two different fractions which lie between $\frac{1}{2}$ and 1.

(2)

     (b)   Pieces of ribbon each $2\frac{1}{8}$ m long are cut from a reel containing 30 m of ribbon.

           (i)   How many pieces, of length $2\frac{1}{8}$ m, can be cut?

(3)

           (ii)   What length of ribbon is left over?

(2)

(Total: 7 marks)

15   The angle of elevation of the top of a tower T, from a point on the ground, P, is 55°.
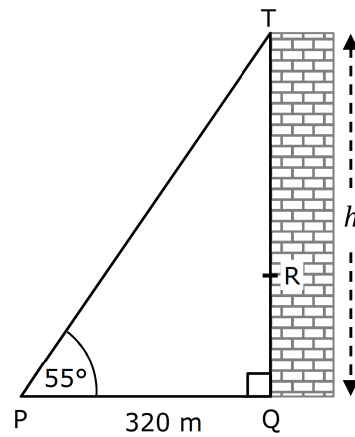   The distance PQ is 320 m.

Diagram not drawn to scale

(a)   Calculate the height, h, of the tower.

(3)

(b)   R is a point on the tower, such that RQ = 150 m.
       Calculate the angle of elevation of R from the point P on the ground.

(3)

(Total: 6 marks)

16   In the given diagram, line PQ is parallel to line SR.
      Lines PV and TU are perpendicular to each other.
      Find the angles marked a, b, c and d. Give reasons for your answer.
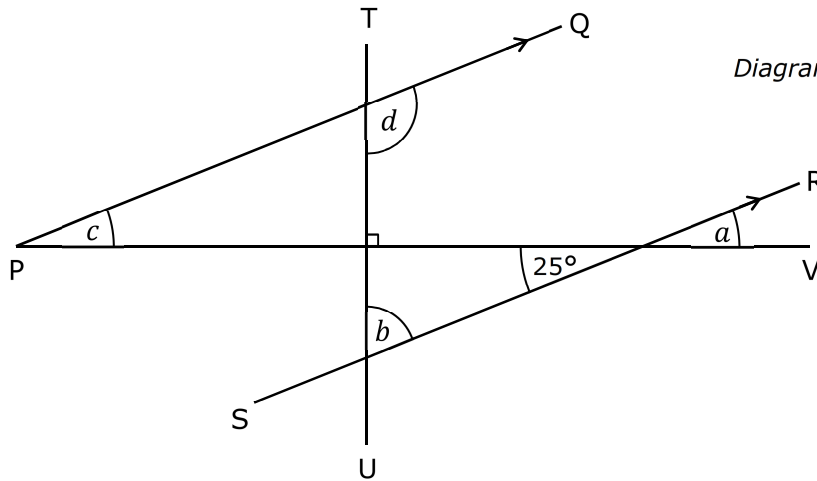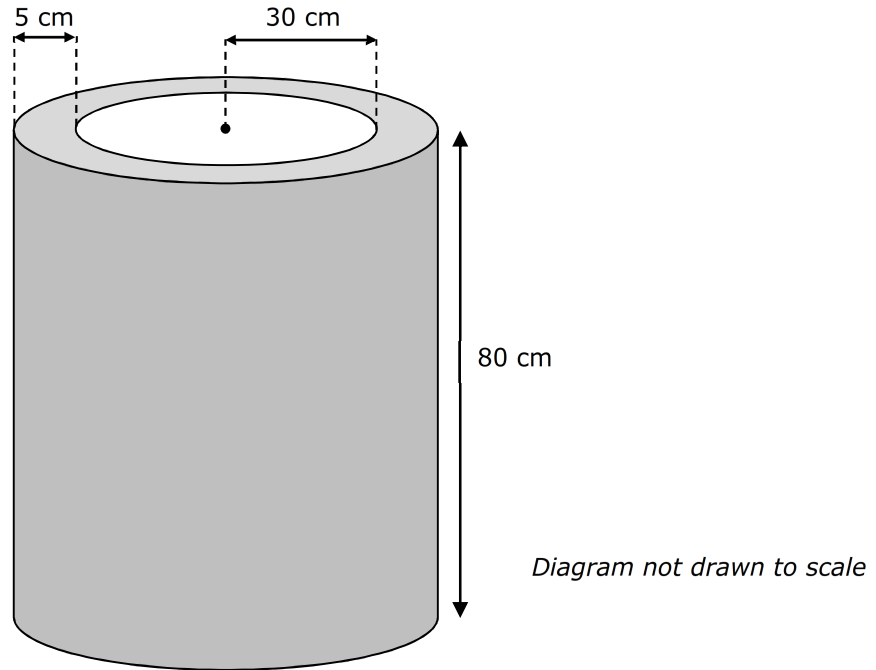

Diagram not drawn to scale

(Total: 8 marks)

17   The figure shows a hollow cylindrical tube of height 80 cm, which is made of concrete.
     The tube has an inner radius of 30 cm. The thickness of concrete is 5 cm throughout.

Diagram not drawn to scale

(a)   Work out the volume of concrete in the tube. Give your answer in litres.
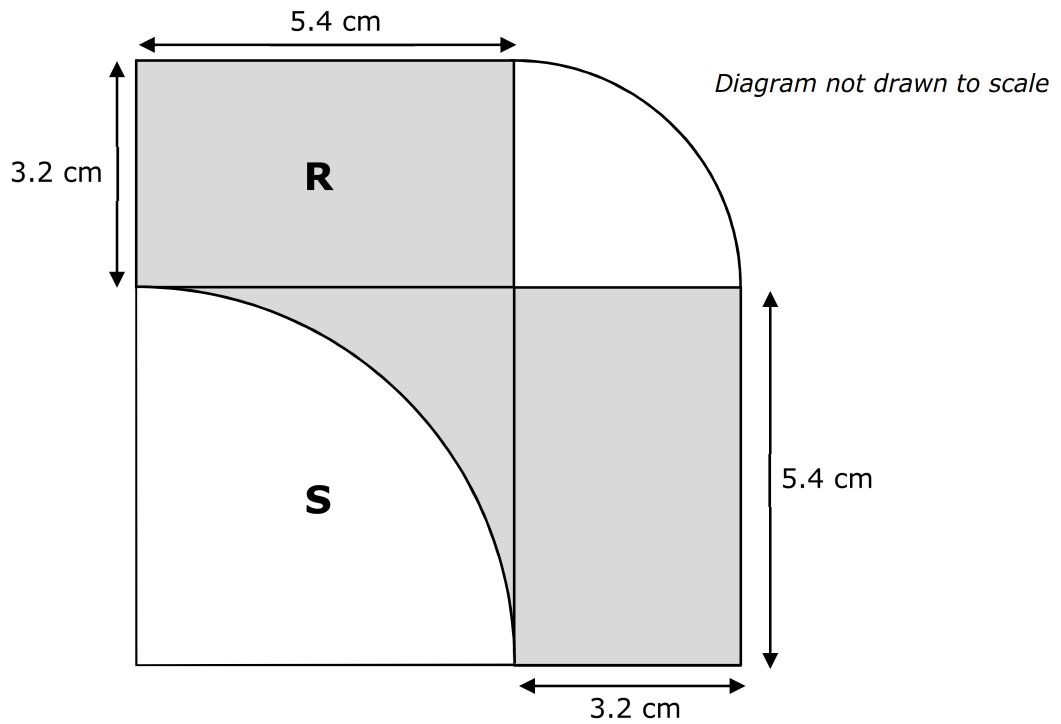
(4)

(b)   Each litre of concrete weighs 2.4 kilograms.
      Work out the weight of the tube, giving your answer correct to the nearest kilogram.

(2)

(Total: 6 marks)

18   The diagram below shows a logo which includes two identical rectangles and two quadrants of circles of different radii.
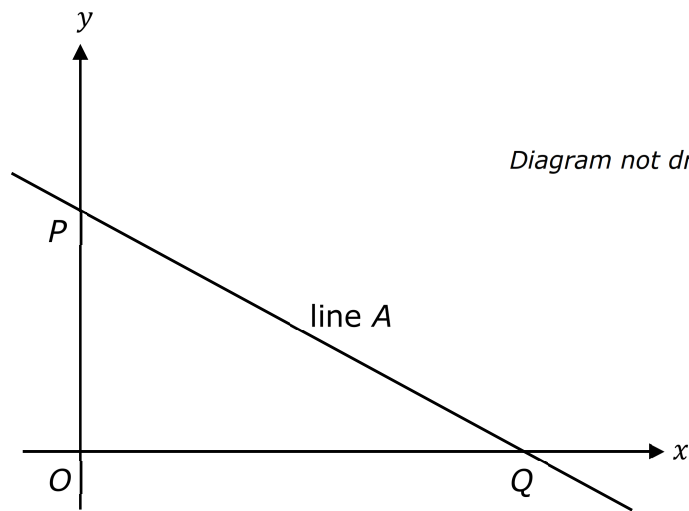

Diagram not drawn to scale

(a)   Find the area of rectangle **R**.

(2)

(b)   Find the area of quadrant of the circle **S**.

(2)

(c)   Find the total area of the shaded part making up the logo.

(4)

(Total: 8 marks)

19   In the diagram below, the equation of line A is given by $y = \dfrac{6-x}{2}$

Diagram not drawn to scale

(a)   Write down the gradient of line A.

(1)

(b)   Line A cuts the y-axis at P. Find the coordinates of point P.

(2)

(c)   Line A cuts the x-axis at Q. Find the coordinates of point Q.

(2)

(d)   If O is the origin, calculate the area of triangle OPQ.

(2)

(e)   Write down the equation of a line parallel to line A.

(1)

(Total: 8 marks)

20   The plan shows a rectangular enclosed yard which is drawn to a scale of 2 cm to represent 1 m. A goat is tied with a rope to a pole at P.
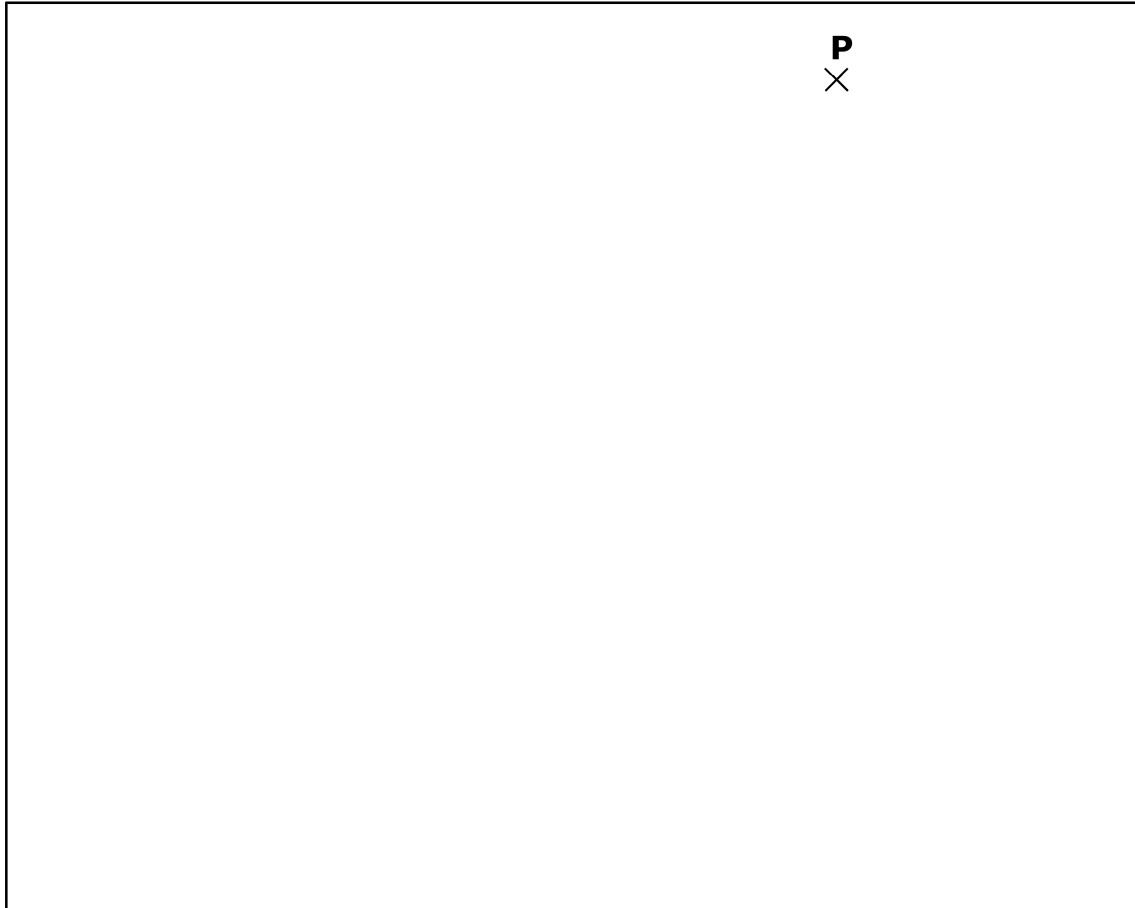
(a)   The rope tying the goat to pole P is 3 m long.
On the diagram above, shade the area of the enclosed yard which the goat may reach.

(3)

(b)   The rope is to be changed so that the goat can reach more area within the enclosed yard. What is the length of the rope so that the goat can reach the furthest position from P within the yard?

(2)

(Total: 5 marks)

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