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

SECONDARY EDUCATION CERTIFICATE LEVEL

MAY 2017 SESSION

SUBJECT: Mathematics	**PAPER:** I – Section A (Non-Calculator Section)
DATE: 6th May 2017	**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   Find the size of the remaining angle of this quadrilateral.
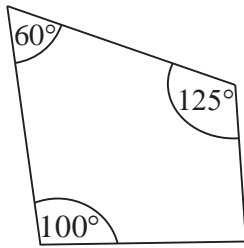

Diagram not drawn to scale

Ans _____

2   Give a prime number which lies between 25 and 35.

Ans _____

3   Write the number two hundred and three thousand and forty eight in digit form.

Ans _____

4   The list below shows the daily midnight temperature recorded over a particular week in Helsinki.
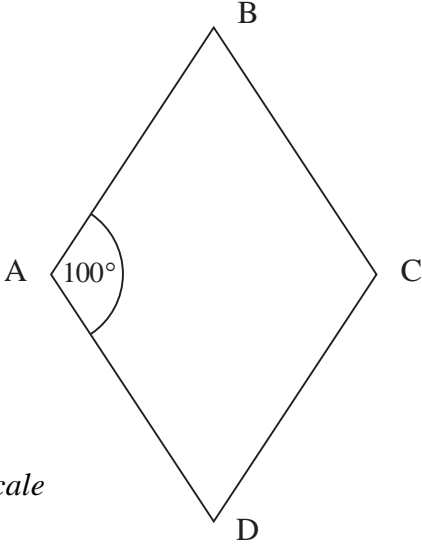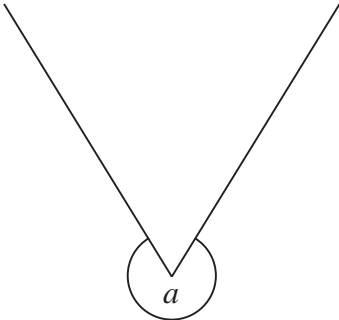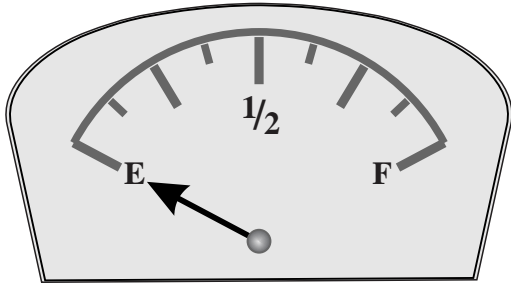
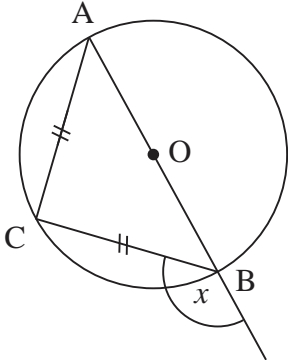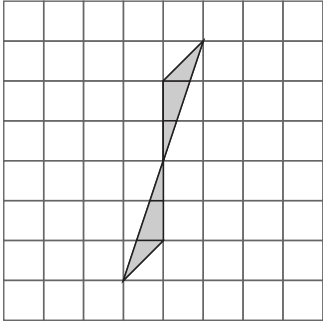 $-3\,°C,\ -4\,°C,\ -2\,°C,\ 0\,°C,\ 1\,°C,\ 0\,°C,\ 1\,°C$

Work out the mean temperature for this week.
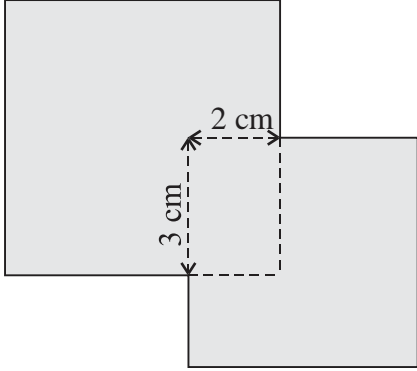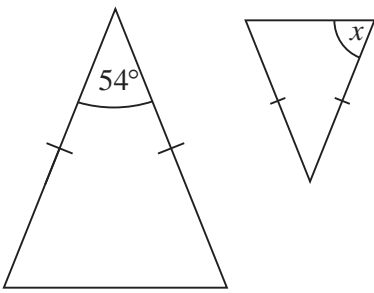
Ans _____

5   The population of Germany is 8.13×10^7.
Write this number as an ordinary number.

Ans _____

QUESTIONS AND ANSWERS ALL QUESTIONS CARRY ONE MARK	SPACE FOR ROUGH WORK (IF NECESSARY)
6 ABCD is a rhombus. Find the size of ∠ADC. B A ⟨100°⟩ C D *Diagram not drawn to scale* **Ans** _____	
7 Write a number in decimal form that lies between $\frac{1}{4}$ and 0.3. **Ans** _____	
8 Solve $3(x + 2) = 4(1 - x)$ **Ans** _____	
9 A TV programme started at 23:20 on Saturday and finished the next morning at 01:17. How long did the programme last? **Ans** _____	
10 Estimate the size of the reflex angle marked *a*. a **Ans** _____	

DO NOT WRITE ABOVE THIS LINE

QUESTIONS AND ANSWERS ALL QUESTIONS CARRY ONE MARK	SPACE FOR ROUGH WORK (IF Necessary)
11 The fuel tank in Esmail's car has a capacity of 56 litres. The diagram shows the fuel gauge in this car when the fuel tank is empty. On the same diagram, mark the position of the pointer when there are 35 litres of fuel in the tank.	
12 The circle below has centre O and diameter AB. The chords AC and BC are equal. Work out the size of the angle marked *x*. *Diagram not drawn to scale* **Ans** _____	
13 Complete the shape so that its order of rotational symmetry is 4. 	
14 What is the value in Euro of a piece of furniture which costs 150 US Dollars (USD). The exchange rate is 1 USD = €0.922106. Give your answer to the nearest Euro. **Ans** _____	

QUESTIONS AND ANSWERS ALL QUESTIONS CARRY ONE MARK	SPACE FOR ROUGH WORK (IF NECESSARY)
15 Two squares, one of sides 5 cm and the other of sides 6 cm are placed as shown in the diagram. Work out the shaded area. 2 cm 3 cm *Diagram not drawn to scale* **Ans** _____	
16 The two triangles below are similar. Work out the size of the angle marked x. 54° x *Diagram not drawn to scale* **Ans** _____	
17 Find the value of p which satisfies this equation: $$p \times 3\frac{1}{2} = 1$$ **Ans** _____	
18 Find the value of x when $4^x = \frac{1}{16}$. **Ans** _____	
19 On Sunday evening Mario had €23 in his money box. His mother gives him €5 pocket money each morning. On week days Mario spends €1.50 each morning. How much money does Mario have in his money box by the evening of the following Thursday? **Ans** _____	
20 In this question, x is an integer greater than 0. What is the smallest value of x such that $48x$ is a square number? **Ans** _____	

SECONDARY EDUCATION CERTIFICATE LEVEL

MAY 2017 SESSION

SUBJECT:	**Mathematics**
PAPER NUMBER:	I – Section B (Calculator Section)
DATE:	6th May 2017
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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Sec A	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**Total**

1   (a)   For each of the following sequences, write down the next term in the space provided.

        (i)   1, 4. 9, 16,   25, _____   (1)

        (ii)   8100, 2700, 900, 300, 100, _____   (1)

        (iii) 1, 2, 4, 8, 16, 32, _____   (1)

    (b)   The volume of a sphere is given by the equation $V = \frac{4\pi r^3}{3}$.
        (i)   Work out the volume V of a sphere whose radius r is 2.5 cm.

                                                                                                   (2)
        (ii)   Work out the radius r of a sphere whose volume V is 2000 cm^3.

                                                                                                   (4)
                                                                                  (Total: 9 marks)

2   Solve the following simultaneous equations:

        $4x - 2y = 11$
        $5x + 2y = 16$

                                                                                  (Total: 4 marks)

3 Use the given diagram to work out the length of the following distances correct to the nearest cm:

(a) AB

Diagram not drawn to scale

(3)

(b) AC
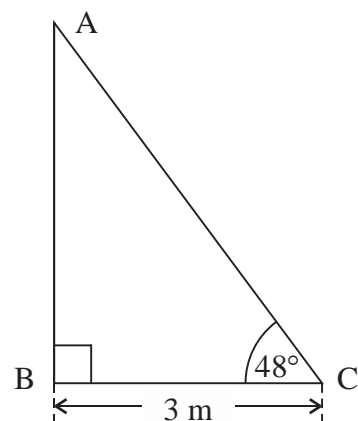
(3)
(Total: 6 marks)

4 Only Party A and Party B contested an election.
All the people who are eligible to vote in an election are called **the electorate.**

In this election, 10% of the electorate did not vote and 2% of the electorate cast an invalid vote.
Party A gained 8% more **of the electorate** than Party B.
If 102, 384 people voted for Party A, work out the total number of people that were eligible to vote in this election.

(Total: 5 marks)

5   A boat sails 40 km due South from **A** to **B**.
     At **B**, the boat changes direction and travels 35 km on a bearing of 250° to **C**.

     (a)   Draw a scale diagram showing the positions of **A**, **B** and **C**.
            Write down the scale used.

(5)

     (b)   Use your scale diagram to determine **the distance** and **bearing of C** from **A**.

(3)

(Total: 8 marks)

6   In the diagram, the height of the poles at P and Q are drawn to scale.
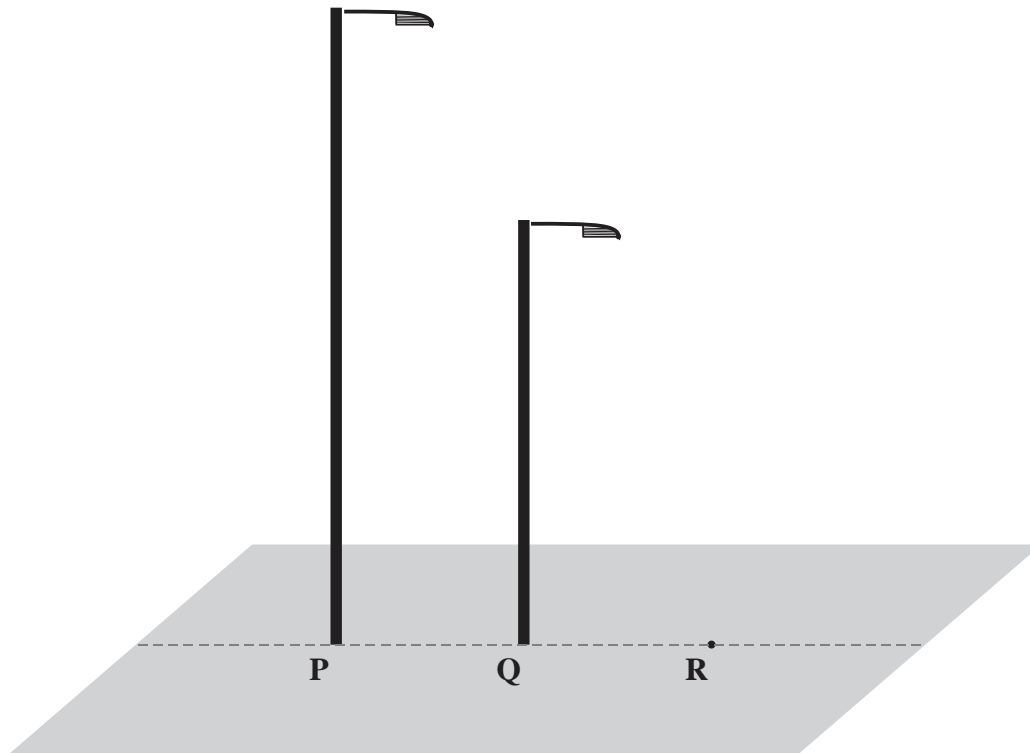
(a)   Another pole is to be erected. Its height is $\frac{3}{4}$ of the height of the pole at Q.
Using the same scale, draw this pole at R on the diagram above.

(2)

(b)   Express the height of the pole at Q as a fraction of the height of the pole at P.

(2)

(c)   If the pole at Q is 4.5 m high, work out the height of the pole at P.

(2)

(Total: 6 marks)

7   (a)   A blend of coffee is made by mixing Coffee A with Coffee B in the ratio 3:2.
            Coffee A costs €12 per kg and Coffee B costs €15 per kg.

     (i)   Calculate the price of 500 g of this blend of coffee.

                                                                                      (3)

     (ii)   Calculate the price of 1 kg of this blend of coffee if it is sold at a profit of 20%.

                                                                                      (3)

     (b)   In a primary class, $\frac{3}{5}$ of the children are girls.

            $\frac{2}{5}$ of the boys play tennis. None of the girls play tennis.

            What fraction of the children in this class play tennis?

                                                                                      (3)
                                                                        (Total: 9 marks)

8   A car was tested for its fuel consumption at different speeds.
     The results are shown in the table below.

Speed in km/h	5	15	50	80	110	130
Distance covered per litre of fuel (km/l)	5	7	12.5	14.2	13.6	8.8

     (a)   Plot the information in this table on the grid given in the next page.
            Join the plotted points with a smooth curve.

                                                                                      (3)
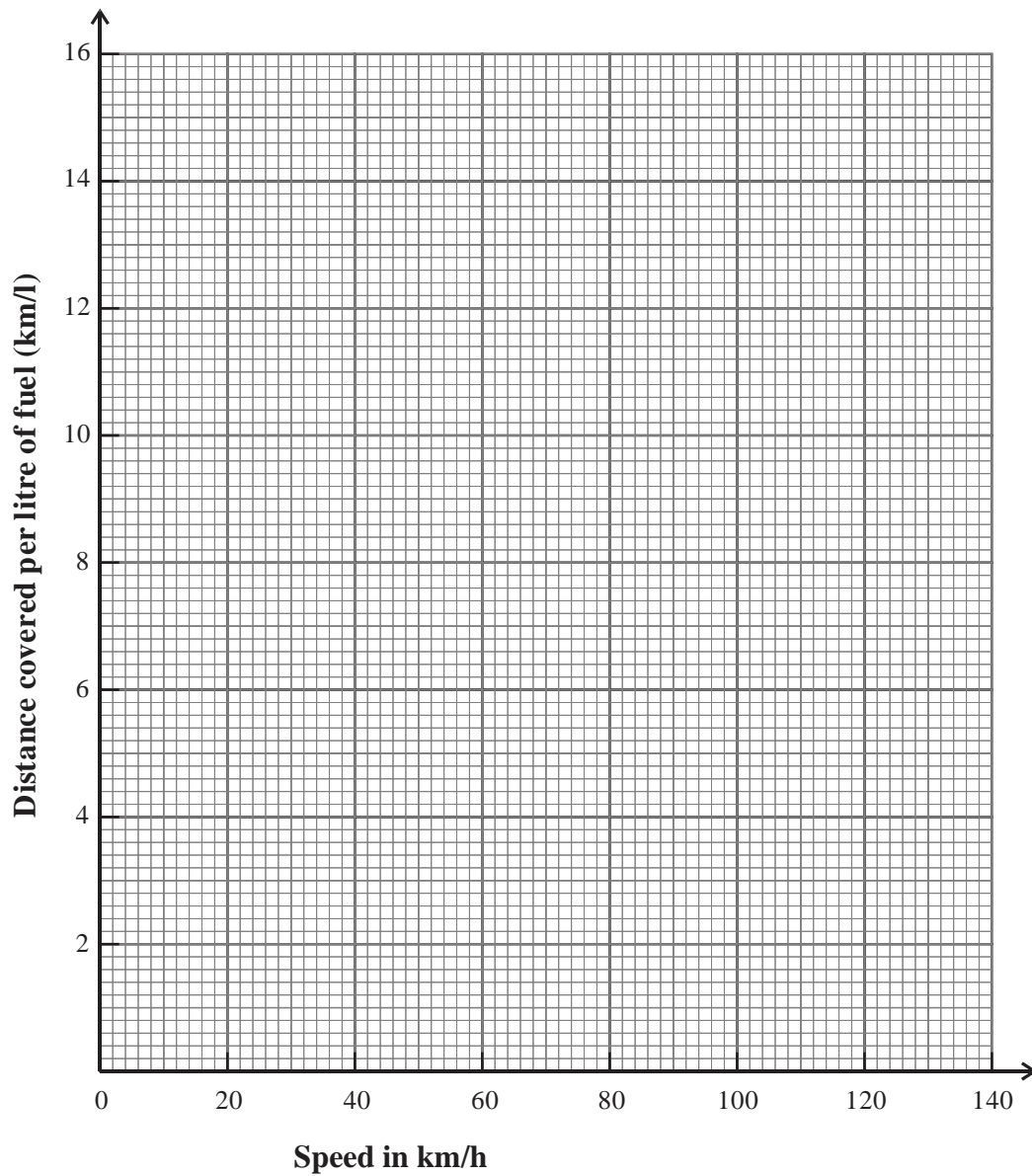
(b)   Use your graph to determine at what speed the car consumes less fuel.

(1)

(c)   This car is driven for 30 minutes at an average speed of 50 km/h. How much fuel is consumed during this journey?

(Total: 7 marks)

9   The following table shows information about the workers at Roger's bakery.

Job title	Number of people	Annual Salary in €
General Manager	1	46,000
Assistant Manager	1	32,000
Kitchen Manager	2	28,500
Speciality Chef	1	26,000
Head Baker	1	23,000
Senior Baker	2	22,000
Baker	5	19,000
Decorator	2	19,000

(a)   Calculate the mean salary of the workers at Roger's bakery. Give your answer to the nearest Euro.

(3)

(b)   What is the mode of the workers' salaries at Roger's bakery?

(1)

(c)   Find the median salary.

(1)

(d)   Give an argument which a senior baker may make to ask for a raise in salary. Build your argument by referring to one from **mode**, **median** and **mean**.

(2)

(e)   A worker left the bakery and was not replaced. The median salary remained the same after the worker left. Give a possible job title of the worker who left the bakery.

(2)

(Total: 9 marks)

10 The diagram shows a gutter which is 5 m long and whose cross-section is a semicircle of radius 10 cm.
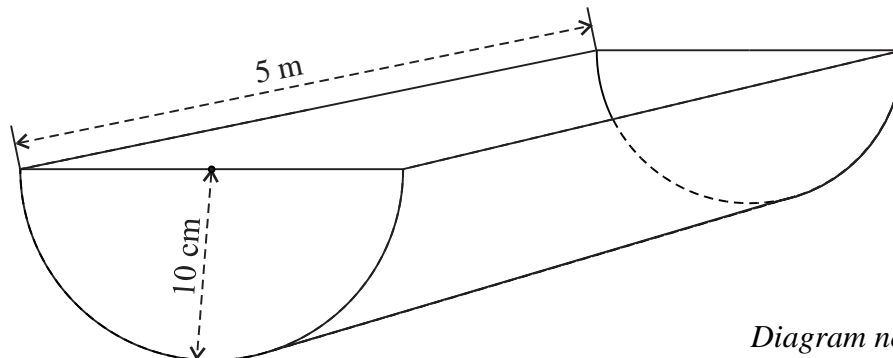
Diagram not drawn to scale

Vince is planning to make this gutter out of a plastic sheet. The gutter will have an open rectangular face but its semicircular faces will be closed with plastic.

(a) Draw a sketch of the parts that Vince needs to cut out to make this gutter.
     Mark clearly the measurements of these parts.

(5)

(b) Work out the volume of water that the gutter can hold correct to the nearest litre.

(4)
(Total: 9 marks)

11 The table below lists some statements about an unknown number *x*.

For each statement, put a tick in one of the adjacent cells to show whether the statement is *True for all given values of x*, *False for all given values of x*, or *Sometimes True and Sometimes False*.

Follow the instructions given in the heading of the grey column to complete this column.

The first two statements are given as examples.

Statement	*True for all given values of x*	*False for all given values of x*	*Sometimes True and Sometimes False*	*When a statement is Sometimes True and Sometimes False, give an example to illustrate each case.* *Otherwise, leave the corresponding cell blank.*
Example 1 For any *x*, $x^2 \geq 0$	✓			
Example 2 For any *x*, $x^2 > x$			✓	$x^2 > x$ is true when $x = 5$. $x^2 > x$ is false when $x = \frac{1}{2}$.
For any *x*, $2x = x^2$				
When $x > 20$, $2x + 23 = 75$				
When *x* is negative, x^4 is negative				
When $x > 0$, $(2x)^3 = 2x^3$				

(Total: 8 marks)

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

SECONDARY EDUCATION CERTIFICATE LEVEL

MAY 2017 SESSION

SUBJECT:	**Mathematics**
PAPER NUMBER:	IIA
DATE:	6th May 2017
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.

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	$\frac{1}{3}$ base area $\times$ perpendicular height
Volume of a Sphere	$\frac{4}{3}\pi r^3$
Solutions of the equation $ax^2 + bx + c = 0$	$x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
Sine Formula	$\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$
Cosine Formula	$a^2 = b^2 + c^2 - 2bc \cos A$

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

1   (a)   Find the value of x so that the expression $15(5^x) + 3$ is equal to 6.

(3)

   (b)   Solve the inequality $3 - x \leq 5$

(2)

   (c)   Make y the subject of the formula $\dfrac{3x}{5} = \dfrac{y}{y-10}$

(4)

(Total: 9 marks)

2   (a)   Simplify $(32x^5y^{10})^{\frac{2}{5}} - (27x^6y^{12})^{\frac{1}{3}}$
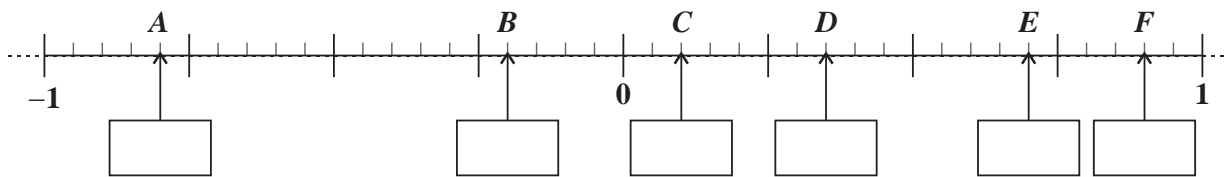
(3)

   (b)   Factorise $5a^2 + 2ab - 3b^2$

(2)

   (c)   Write $\dfrac{2x}{x-1} - \dfrac{7x-3}{x^2-1}$ as a single fraction in its simplest form.

(4)

(Total: 9 marks)

3   (a)   The numbers A, B, C, D, E and F are shown on the number line below.

−1   0   1

(i)   Write down the values of A, B, C, D, E and F in the corresponding boxes on the diagram above.

(2)

(ii)   A number x is such that $A < x < B$.
Write down a possible value of x.

(1)

(iii)   For what value of x is $F = xC - B$?

(1)

(b)   A lottery is held every week using a packet of 90 tickets. The winning number is drawn from the integers from 1 to 90.
Mona buys five tickets in the first week and one ticket in the second week.

(i)   What is the probability that Mona wins in the first week?

(1)

Using a tree diagram or otherwise; work out the probability that:
(ii)   Mona wins on both weeks;

(2)

(iii)   Mona wins just once in these two weeks.

(3)

(Total: 10 marks)

4　(a)　Complete the table of values for the graph of $y = \frac{10}{x} - 3$

x	1.0	1.2	1.4	1.6	1.8	2.0
$\dfrac{10}{x} - 3$	7	5.33	4.14		2.56	

(1)

(b)　The graph of $y = x^3 - 1$ has been plotted on the next page. On the same axes, plot the graph of $y = \frac{10}{x} - 3$

(3)

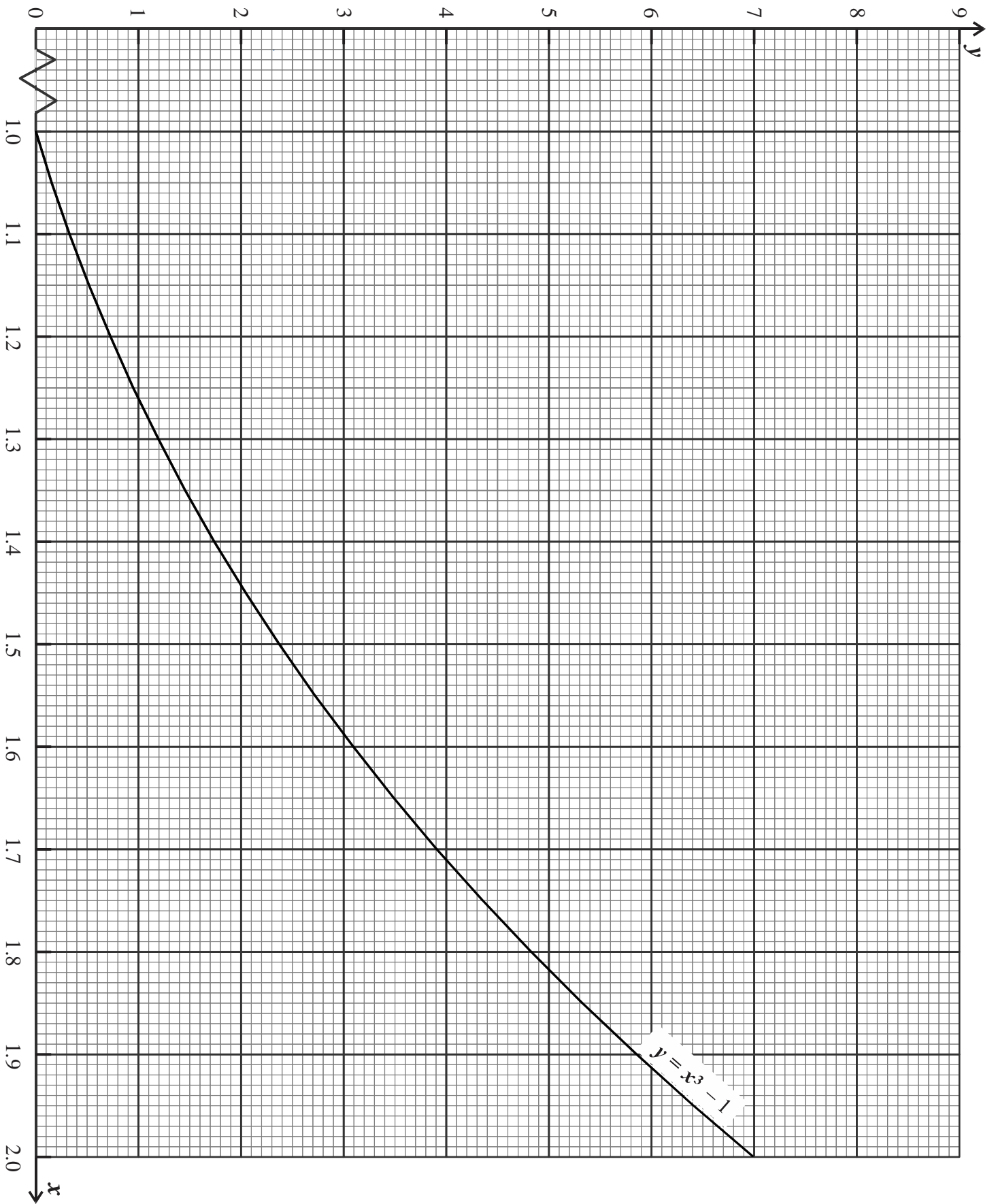(c)　Show that the equation $x^4 + 2x - 10 = 0$ is satisfied at the point of intersection of the two graphs.

(2)

(d)　Use the trial and improvement method to find the solution of the equation $x^4 + 2x - 10 = 0$ between 1 and 2 correct to 3 decimal places. Show your working.
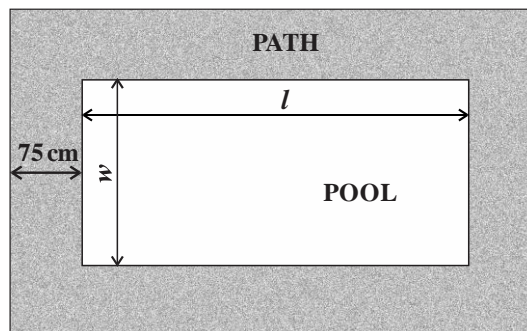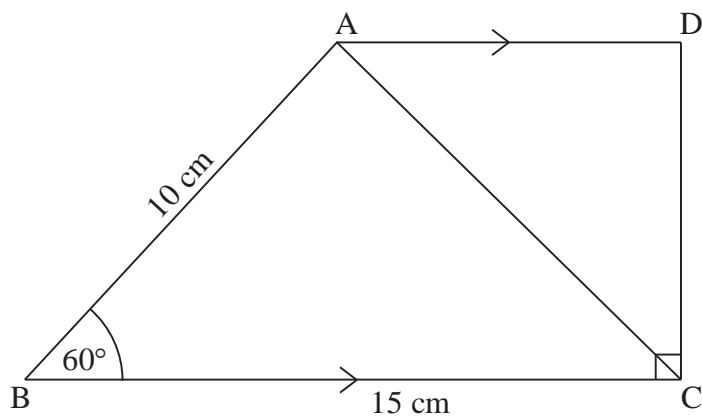
(4)

(Total: 10 marks)

$y = x^3 - 1$

5   Tom's rectangular pool has a perimeter of 20 m.
     The pool is surrounded by a path 75 cm wide.
     The total surface area of the pool and path is 40 m^2.
     Work out the length l and the width w of the pool.

Diagram not drawn to scale

(Total: 6 marks)

6   In the given figure, ABCD is a quadrilateral in which AD is parallel to BC, AB = 10 cm,
     BC = 15 cm, $\angle$BCD = 90° and $\angle$ABC = 60°.

Diagram not drawn to scale

(a)   Use the cosine formula to find the length of AC.

(3)

(b)   Find the size of angle ACD.

(4)

(c)   Work out the lengths of AD and DC.

(4)

(d)   Determine the area of quadrilateral ABCD.

(2)

(Total: 13 marks)

7   On 1st January 2010, Simone deposits €2000 in a bank account that offers 3% compound interest compounded annually. She further deposits €100 on the first day of each subsequent year in the same account.

(a)   After how many years will the money in Simone's account exceed €2380? Show your working.

(4)

(b)   The amount *A* after *n* years, in such an account, can be worked out using the formula

$$A = dm^n + \frac{x(m^n - m)}{m-1} \quad \text{where:}$$

d is the initial amount deposited,
$m = 1 + \frac{r}{100}$ where *r* is the rate of compound interest, and
x is the constant deposit made each subsequent year.

Use this formula to confirm your result in part (a) of this question.

(2)
(Total: 6 marks)

8 (a) Complete the table below so that y is directly proportional to x.

x	3	5	7	9
y			42	

(2)

(b) Complete the table below so that q is inversely proportional to p.

p	2	4	8	10
q	50			

(2)

(c) Four statements are given in the table below. For each statement, determine whether the statement is true or false. Explain your reasoning.

Statement	True or False	Reason
The circumference C of a circle is directly proportional to its radius r.		
The area A of a circle is directly proportional to its radius r.		
The time T taken to run a 10 km race is inversely proportional to the average speed s of the runner.		
The time taken for shirts to dry out in the sun is proportional to the number of shirts hung out on the line.		

(8)

(Total: 12 marks)

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9   Two quarter circles were cut out from a rectangle as shown in the diagram.
    The two quadrants meet at D. Use the information given in the diagram to:

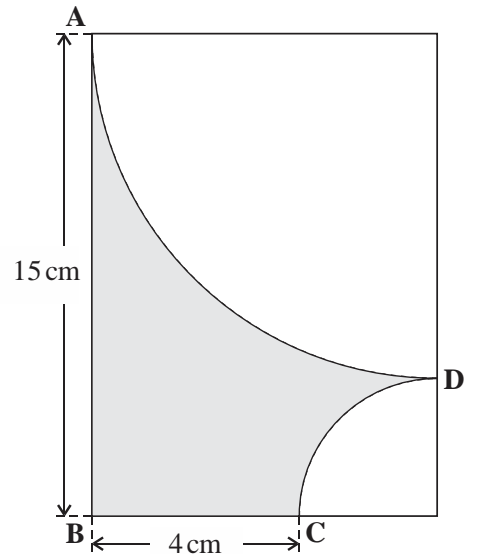   (a)   find the radii of the two circles;

15 cm

A

D

B ← 4 cm → C

Diagram not drawn to scale

(4)

    (b)   find the shaded area.

(2)

(Total: 6 marks)

10 Mark works at a call centre. He kept a record of the time that clients needed to wait for their
    telephone calls to be answered. These times are shown in the table below.

Time (minutes)	Frequency	Frequency Density
$0 < t \le 0.5$	12	
$0.5 < t \le 1$	15	
$1 < t \le 3$	21	
$3 < t \le 6$	9	
$6 < t \le 10$	2	

   (a)   Work out the frequency density for each class interval to complete the table above.   (2)
    (b)   Using the information in the above table, draw a histogram on the graph paper provided.
          Use Time on the horizontal axis and Frequency Density on the vertical axis.   (3)
    (c)   Estimate the percentage of calls that took between 2 and 5 minutes to be answered.

(3)

(Total: 8 marks)

Frequency Density

Time in minutes

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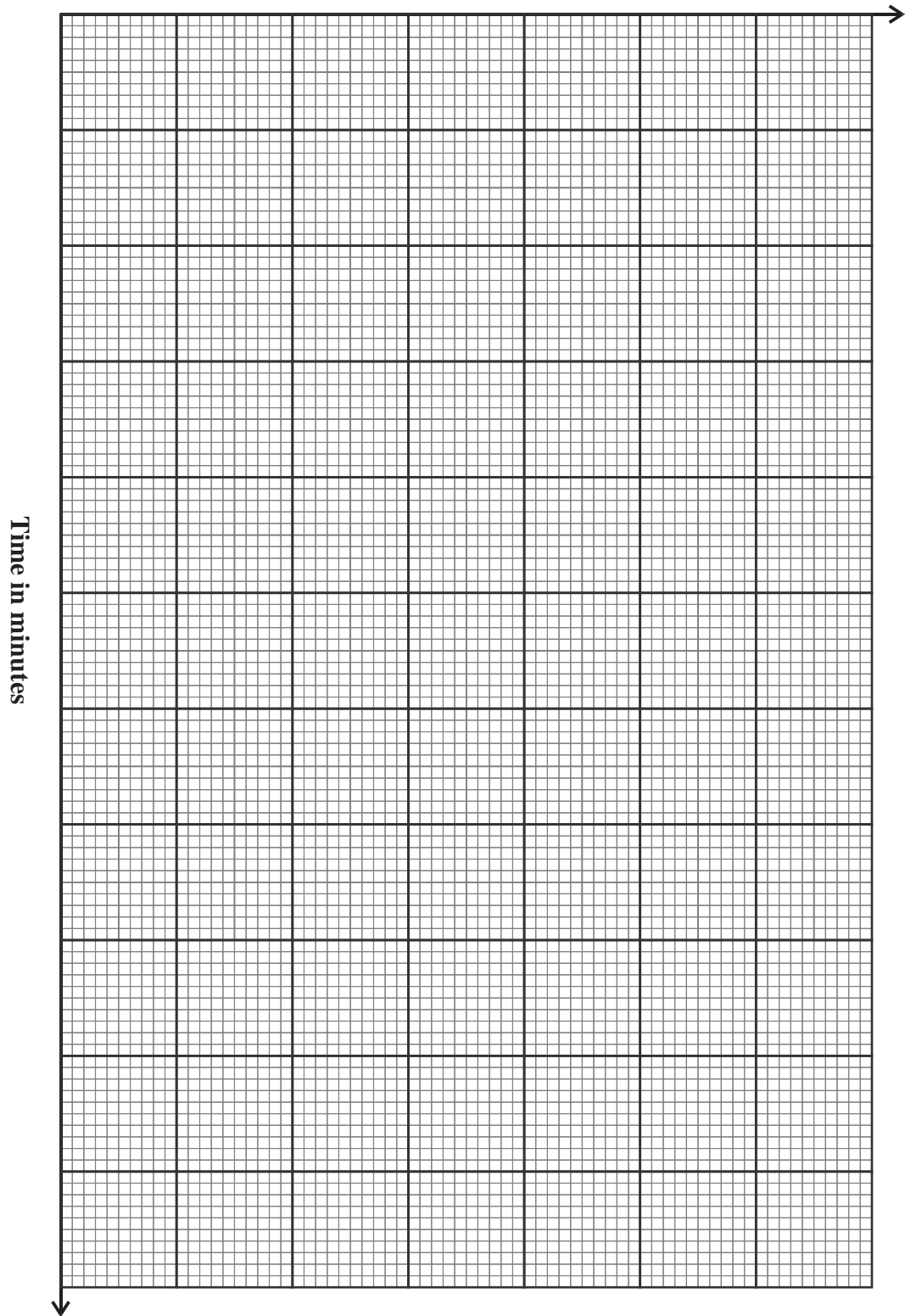
11 The diagram shows a right cone which has a base radius of 9 cm and is 20 cm high.
    The cone is cut by a plane parallel to its base and 13 cm away from it.
    A circular base of radius *r* is fitted to the frustum to form a **container** with a circular open face
    of radius 9 cm.
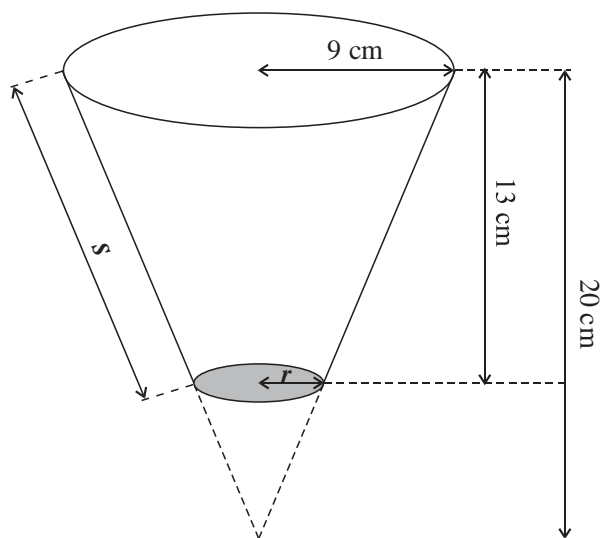
    (a) Show that the radius *r* of the base
         of the container is 3.15 cm.

Diagram not drawn to scale

(3)

    (b) Calculate the capacity of the container.

(4)

    (c) Calculate the length of the slant height *s* of the container.

(4)
(Total: 11 marks)

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

SECONDARY EDUCATION CERTIFICATE LEVEL

MAY 2017 SESSION

SUBJECT:	**Mathematics**
PAPER NUMBER:	IIB
DATE:	6th May 2017
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.

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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**
Mark									

Question No	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**
Mark									

Total Mark	

1   Fill in the blank spaces to complete the following statements:

(a)   738 mm = _____ cm

(b) $1\frac{3}{4}$ litres = _____ ml

(c)   1 day = _____ minutes

(d)   1.5 cm^2 = _____ mm^2

(e)   When rounded to 2 significant figures, the number 346100 becomes _____

(f)   A number between 0.1 and 0.2 is _____

(Total: 6 marks)

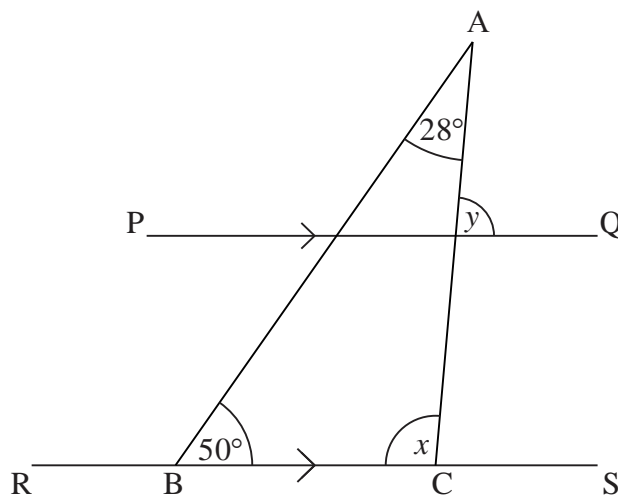2   In the diagram below, the line PQ is parallel to the line RBCS.

Diagram not drawn to scale

Use the information in the figure to work out the size of the angles marked *x* and *y*. Explain your reasoning.

(Total: 4 marks)

3 A survey was carried out in two schools, School A and School B.

In this survey, children were asked for their preference amongst the following types of movies: Action, Science Fiction, Drama, Romance and Comedy.

There were 280 children taking part in the survey in School A and 180 children in School B.

The results of the survey are shown in the Pie Charts below.

Favourite Type of Movie

School A   **School B**

Action   Science Fiction   Drama   Romance   Comedy
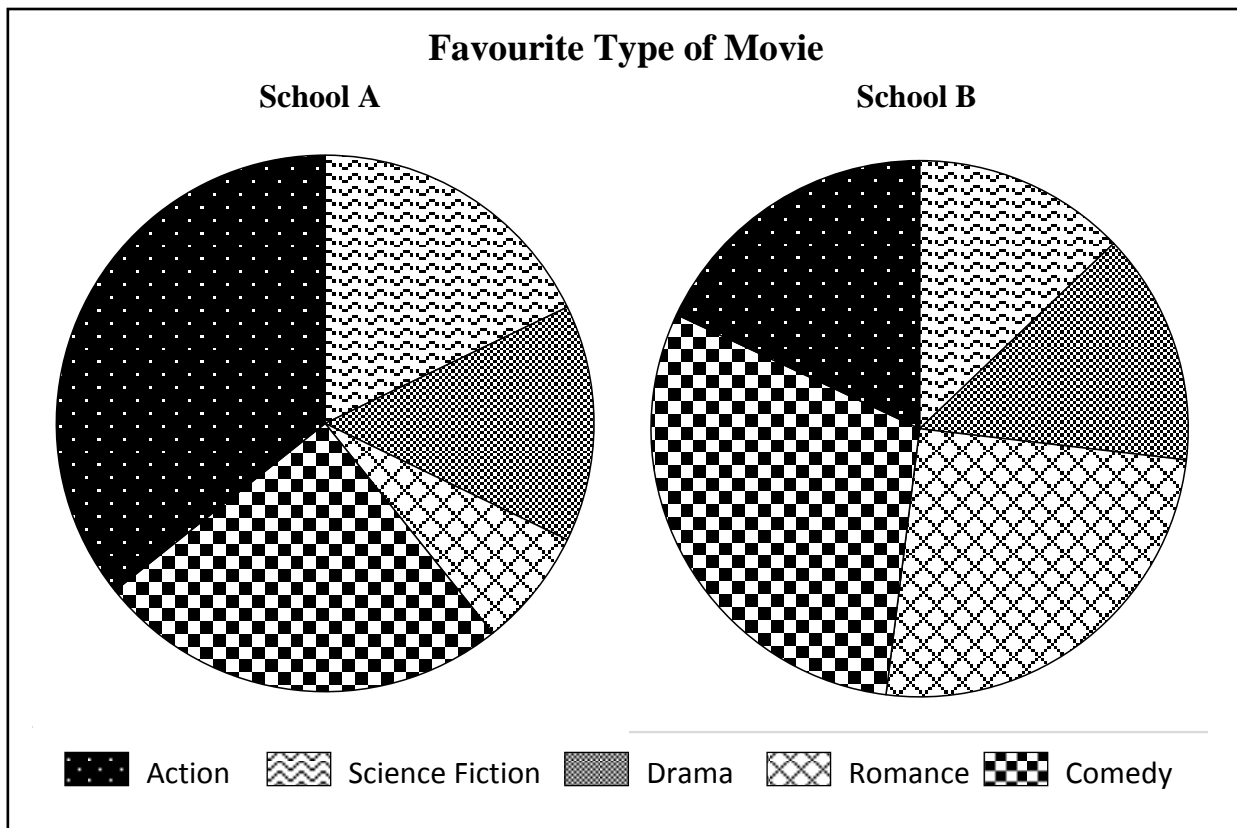
(a) Work out the number of children in School A who chose Comedy as their favourite type of movie.

(2)

(b) What percentage of children from the two schools taken together chose Comedy as their favourite type of movie?

(3)

(Total: 5 marks)

4   **Use ruler and compasses only in this question.**

(a)   Using line AB drawn below as base, construct triangle ABC with ∠CAB = 60° and AC = 11 cm.

(3)

(b)   Construct the perpendicular bisector of AB.
Name the point where this bisector meets AB as X.

(2)

(c)   Construct the bisector of angle CBA.
Name the point where the two bisectors meet as O.

(2)

(d)   Draw a circle centre O and radius OX.

(1)

A   **B**

(Total: 8 marks)

5   Karl makes a model of the Big Ben clock tower using a scale of 1 to 200.

    (a)   The height of the model is 48.75 cm.
        What is the height in metres of the actual clock tower?

(3)

    (b)   The minute hand on the actual clock faces is 4.27 m long. How long
        is the minute hand on the model?

(3)
(Total: 6 marks)

6   In a weekly lottery, the winning number is drawn at random from all the integers from 1 to 90.

    (a)   What is the probability that the winning number is a multiple of 10?

(2)

    (b)   Four statements about the draws of this lottery are given below. Mark with a tick (✓) in
        the second column the statement that **is true**.

(a) A multiple of 10 is drawn in any 10 lottery draws.	
(b) In 1000 lottery draws, a multiple of 10 is drawn around 300 times.	
(c) In 1000 lottery draws, a multiple of 10 is drawn around 100 times.	
(d) In 1000 lottery draws, a multiple of 10 is drawn exactly 90 times.	

(2)
(Total: 4 marks)

7   A supermarket has three options for buying crisps:

Option 1: A pack containing 180 g of crisps costs €1.99.

Option 2: A bag with 6 packs costs €2.70. Each pack contains 25 g of crisps.

Option 3: Buy two packs of crisps and get another pack free. Each pack contains 50g of crisps and costs 65c.

Which option gives the best value for money? Show your working.

(Total: 7 marks)

8   Water increases in volume by 9% when it is frozen.
     What volume of water is needed to make 1000 cm^3 of ice?

(Total: 3 marks)

9   Sharon is shopping online for a sofa.
     She finds the following offer on an English website.

FOUR SEATER SOFA   **SLASHED PRICE   £1399**

32″

93″   46″

(a)   Calculate the length and width of this sofa in metres. Take 1″ (one inch) = 2.54 cm.
       Give your answer correct to the nearest centimetre.

(3)

(b)   To bring this sofa to Malta, Sharon also needs to pay a fee of £350 for shipping and
       delivery. Work out the total cost in Euro to buy this sofa. Take 1 Sterling (£1) to be equal
       to €1.169.

(3)
(Total: 6 marks)

10   650 tickets were sold for a school concert.
     An adult ticket costs €8.50 and a child ticket costs €5.
     A total of €4,720 was collected from the sale of tickets.
     Work out how many tickets of each type were sold.

(Total: 5 marks)

11   (a)   The interior angles of a regular polygon are all equal to 160°. How many sides does this
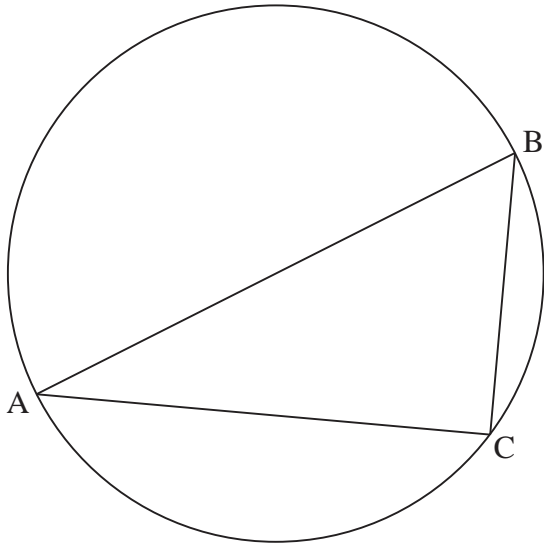   polygon have?

(2)

     (b)   Is it possible to draw a regular polygon with interior angles equal to 100°?
           Explain your answer.

(3)
(Total: 5 marks)

12   The diagram shows a circle of radius 0.5 m. AB is a diameter of this circle.
      AC is a chord of length 0.8 m.

(a)   Explain why ABC is a right-angled triangle.

Diagram not drawn to scale   (1)

(b)   Work out the length of BC.

                                                                                (3)

(c)   Work out the size of angle ABC.

                                                                                (2)
(Total: 6 marks)

13   An alloy is made by melting together copper, zinc and tin.

$\dfrac{7}{10}$ of its weight comes from copper.

$\dfrac{3}{25}$ of its weight comes from zinc.

(a)   What fraction of the weight of this alloy comes from tin?

(2)

(b)   How much copper is needed to make 900 g of this alloy?

(1)

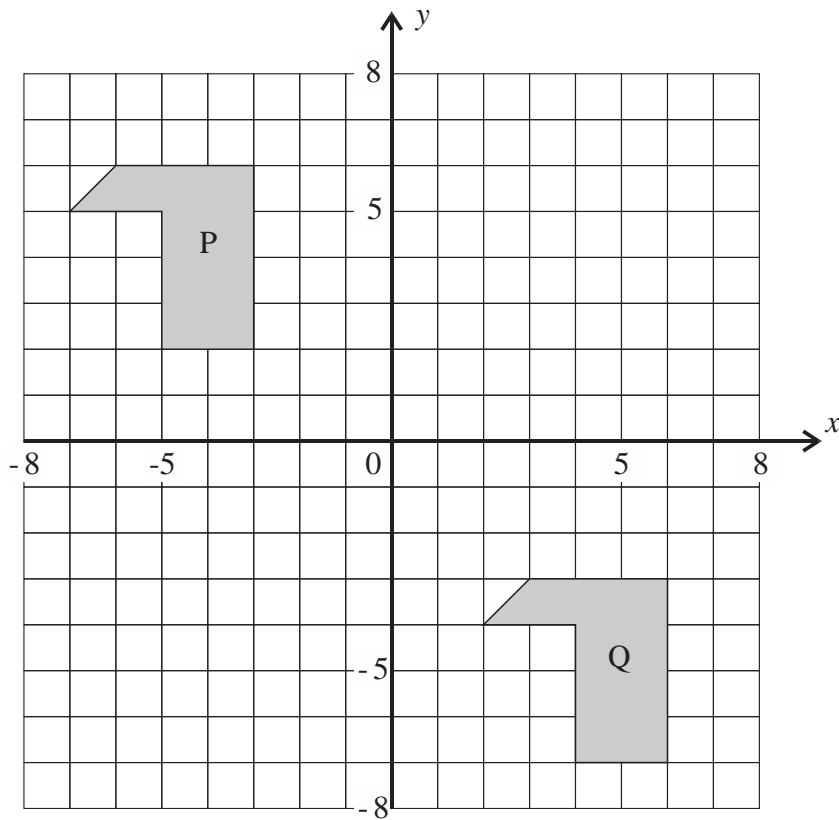(c)   What percentage of the weight of this alloy comes from zinc?

(1)

(d)   For this alloy, work the following ratio:

weight of copper : weight of zinc : weight of tin

(1)
(Total: 5 marks)

14

(a) Describe fully the transformation which maps shape P onto shape Q.

(2)

(b) Reflect shape P in the *x*-axis to obtain shape R.

(1)

(c) Rotate shape P by 90° clockwise about (0, 0) to obtain shape S.

(2)

(Total: 5 marks)

15   The temperature C measured in degrees Celsius (°C) is related to the temperature F measured in degrees Fahrenheit (°F) by the equation:

$$\frac{C}{5} = \frac{F-32}{9}$$

(a)   What is the temperature in °C when it is 104°F?

(1)

(b)   What is the temperature in °F when it is 180°C?
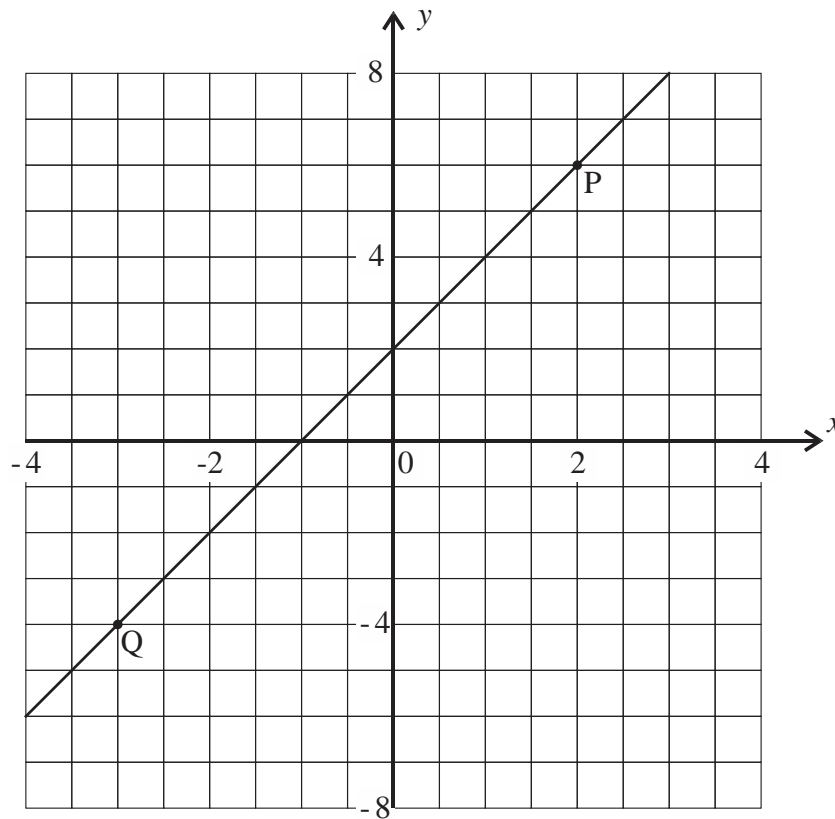
(1)

(c)   Make F the subject of the formula $\frac{C}{5} = \frac{F-32}{9}$

(3)

(Total: 5 marks)

16   The graph below shows a line passing through the points P and Q.

(a)   What are the coordinates of points P and Q?

(2)

(b)   Some of the following equations describe the equation of the line graph which passes through P and Q. Which are they?

(i) $y = x + 2$

(ii) $y = 2x + 2$

(iii) $y = 2$ and $x = -1$

(iv) $y - 2x = 2$

(2)

(Total: 4 marks)

17   A bolt of lightning starts at a point P.
      The speed of sound in air is 340 m/s and the speed of light in air is 300, 000 km/s.
      Point Q is 5 km away from point P.

      (a)   How long does it take the thunder sound to travel from P to Q?
             Give your answer correct to the nearest second.

                                                                                          (3)

      (b)   How long does it take the flash of lightning to travel from P to Q?
             Give your answer in standard form correct to 3 significant figures.

                                                                                          (3)

      (c)   Which arrives first at Q, the flash or the sound of lightning? Give the time difference
             correct to the nearest second.

                                                                                          (2)
                                                                             (Total: 8 marks)

18   Mary buys a pack of sugar paste to cover her cakes. The pack is in the shape of a cuboid measuring 5 cm by 8 cm by 9 cm.

(a)   She rolls out her sugar paste into a rectangular sheet of pastry of uniform thickness measuring 30 cm by 60 cm. Work out the thickness of this rectangular sheet.

(4)

(b)   As shown in the diagram, Mary cuts out two circular pieces of pastry, each of diameter 25 cm, from her rectangular sheet of pastry. What volume of pastry remains when she removes these two circular pieces of pastry?
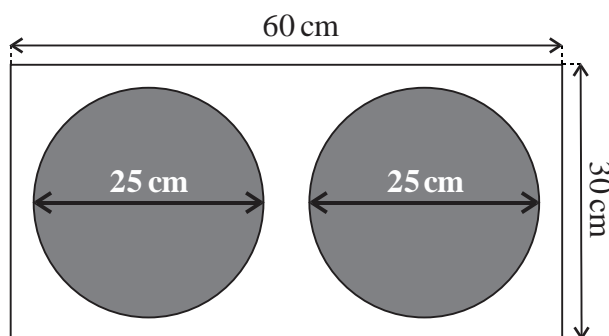

60 cm

25 cm   25 cm

30 cm

Diagram not drawn to scale

(4)

(Total: 8 marks)

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