

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

SECONDARY EDUCATION CERTIFICATE LEVEL

MAY 2014 SESSION

SUBJECT: Mathematics
DATE: 10th May 2014

PAPER: I – Section A (Non-Calculator Section)
TIME: 20 minutes

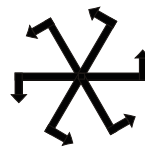
ATTEMPT ALL QUESTIONS.

*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** What is the order of rotational symmetry of the shape shown?



Ans _____

- 2** What is the **Least Common Multiple** of 6, 4 and 8?

Ans _____

- 3** Which of the following expressions is equal to $25a^2b$?

A $5(5 + ab)$

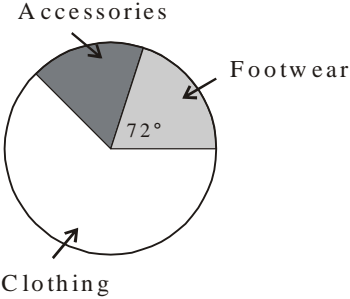
B $5a \times 5ab$

C $25 + a + ab$

D $25 + a^2 + b$

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 Which of the following is the best estimate for $\sqrt{90 - 55}$?</p> <p style="text-align: center;">A 9 B 2 C 17 D 6</p> <p style="text-align: right;">Ans _____</p>	
<p>5 Simplify:</p> $\frac{7a - 4}{5} + \frac{3a + 4}{5}$ <p style="text-align: right;">Ans _____</p>	
<p>6 A flight leaves Malta at 7:50 a.m. and arrives in Paris at 10:40 a.m. local time. Paris and Malta are in the same time zone. How long does the flight take?</p> <p style="text-align: right;">Ans _____</p>	
<p>7 One of the angles of an isosceles triangle is 110°. What is the size of the other two angles?</p> <p style="text-align: right;">Ans _____ and _____</p>	
<p>8 Which of the following represents the number 2×10^8 in words?</p> <p style="text-align: center;">A two billion B twenty million</p> <p style="text-align: center;">C two hundred million D two hundred thousand</p> <p style="text-align: right;">Ans _____</p>	
<p>9 Write a fraction that is between $\frac{1}{3}$ and $\frac{2}{3}$.</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>10 Work out the value of:</p> $\frac{2^5 \times 3^3}{3^2 \times 2^3}$ <p style="text-align: right;">Ans _____</p>	
<p>11 The pie chart illustrates the sales of different items in a sportswear shop last year.</p> <div style="text-align: center;">  </div> <p>What percentage of the sales were footwear?</p> <p style="text-align: right;">Ans _____</p>	
<p>12 Evaluate $12 \times 6.5 + 8 \times 6.5$</p> <p style="text-align: right;">Ans _____</p>	
<p>13 Find a number between 20 and 30 that leaves a remainder of 3 when divided by 8.</p> <p style="text-align: right;">Ans _____</p>	
<p>14 A straight line passes through the points $(-4, -1)$ and $(8, 11)$. What is the gradient of the line?</p> <p style="text-align: right;">Ans _____</p>	

QUESTIONS AND ANSWERS ALL QUESTIONS CARRY ONE MARK	SPACE FOR ROUGH WORK (IF NECESSARY)
<p>15 Rita thinks of a number. She adds half the number to a quarter of the number. The result is 30. What was the number Rita thought of?</p> <p style="text-align: right;">Ans _____</p>	
<p>16 A laptop costs €500 before charging VAT. If VAT is charged at 18%, what amount should be paid on VAT?</p> <p style="text-align: right;">Ans _____</p>	
<p>17 Which of the following is NOT equal to 0.2?</p> <p>A 20% B $\frac{2}{10}$ C 2^{-1} D $\frac{1}{5}$</p> <p style="text-align: right;">Ans _____</p>	
<p>18 Work out:</p> <p style="text-align: center;">$(1.1 \times 10^{-3}) \times (8 \times 10^{-5})$</p> <p>Give your answer in standard form.</p> <p style="text-align: right;">Ans _____</p>	
<p>19 A boat was bought for €20 000. After 4 years it was sold for €12 000. What was the percentage loss?</p> <p style="text-align: right;">Ans _____</p>	
<p>20 Find the value of:</p> <p style="text-align: center;">$\frac{90}{120 \times 45 - 20 \times 45}$</p> <p style="text-align: right;">Ans _____</p>	

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

SECONDARY EDUCATION CERTIFICATE LEVEL

MAY 2014 SESSION

SUBJECT:	Mathematics
PAPER NUMBER:	I – Section B (Calculator Section)
DATE:	10 th May 2014
TIME:	1hr and 40 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.

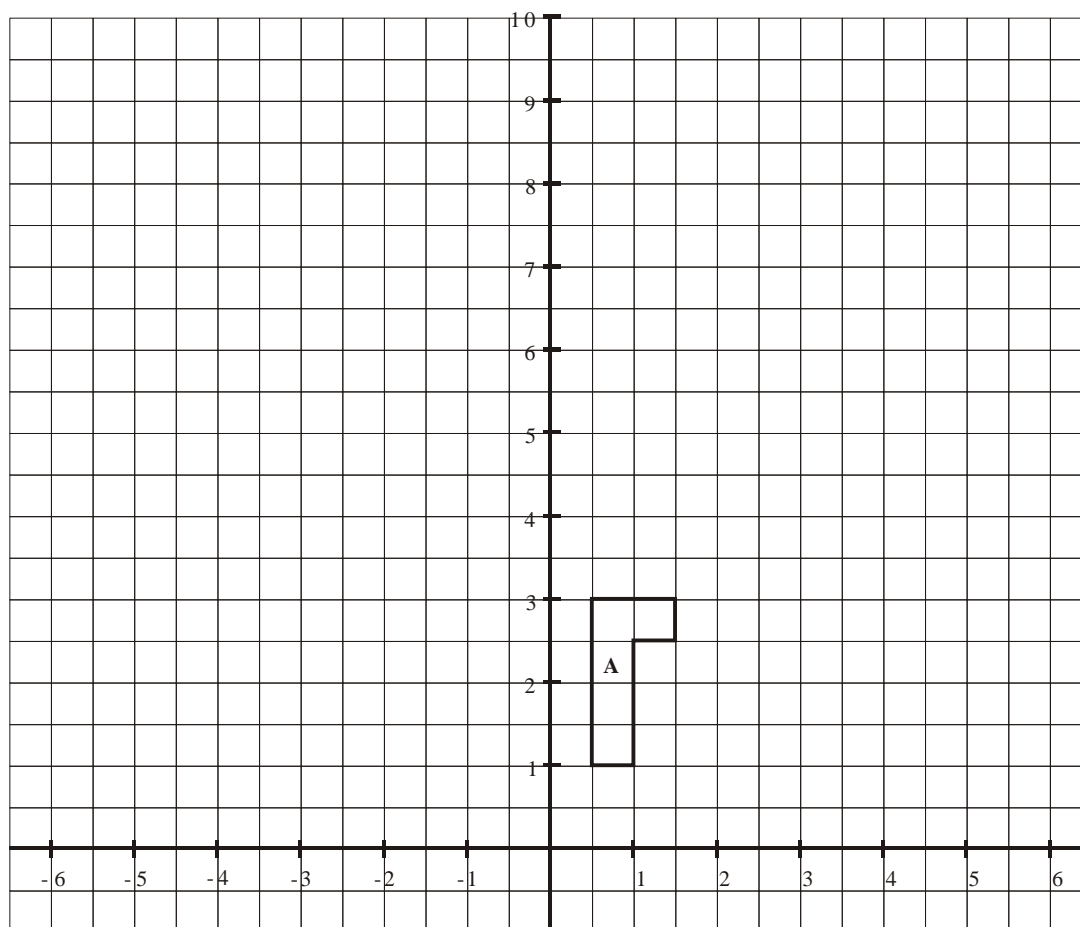
The use of non-programmable electronic calculators with statistical functions and mathematical instruments is allowed.

Candidates are allowed to use transparencies for drawing transformations.

This paper carries a total of 80 marks.

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

1



Use the figure above to answer the following questions.

- (i) Enlarge shape A by 3 about (0,0) and label the image shape B.

2 marks

- (ii) Reflect shape A in the y axis and label the image shape C.

2 marks

- (iii) Reflect shape C in the line $y = -x$ and label the image shape D.

2 marks

- (iv) Describe the single transformation which maps shape A directly onto shape D.

2 marks

DO NOT WRITE ABOVE THIS LINE**2a** Solve the following equations to find the value of x .

(i) $3x + 7 = 24$	(ii) $3(x + 1) - (x - 5) = 10$
(iii) $3x = \frac{1}{27}$	(iv) $3^x = \frac{1}{27}$

6 marks**2b** Solve the simultaneous equations:

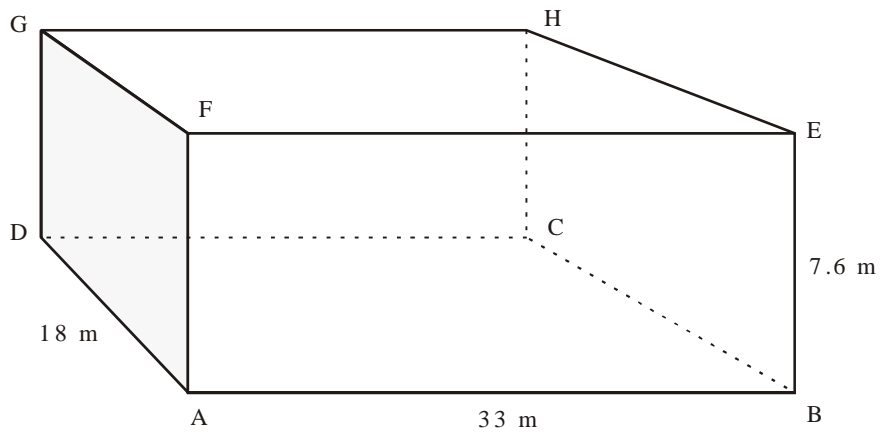
$$4x + 9y = 3$$

$$5x - 3y = 18$$

4 marks

DO NOT WRITE ABOVE THIS LINE

3



A reservoir has the shape of the cuboid above. Work out:

(i) The area of ABCD, the base of the reservoir.

1 mark

(ii) The surface area of the **four vertical walls** of the reservoir.

3 marks

(iii) Use a sketch of ABCD, the base of the reservoir, to determine:

a. the length of AC, the diagonal of ABCD.

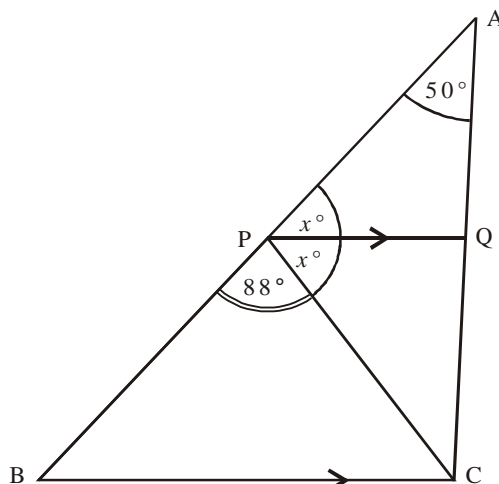
2 marks

b. the size of $\angle BAC$.

2 marks

DO NOT WRITE ABOVE THIS LINE

4

Diagram not drawn
to scale

In the diagram above, the point P lies on side AB whilst Q lies on side AC of triangle ABC. Angles BAC and BPC are 50° and 88° respectively. Line PQ is parallel to BC and it bisects angle APC.

a. Calculate the size of the following angles, giving reasons for your answer:

(i) $\angle APQ$

(ii) $\angle AQP$

(iii) $\angle PBC$

(iv) $\angle ACP$

8 marks

b. Prove that triangles APQ and ABC are similar.

2 marks

5 Twelve girls and 8 boys in a class took the same test.

The mean mark for the girls is 65% and the mean mark for the boys is 55%

Use the information above to answer the following questions:

(i) Calculate the mean mark of the class overall.

3 marks

(ii) Pat said, “The mode for the boys’ marks **must be** lower than the mode for the girls’ marks.”

Is Pat correct? Explain your answer.

2 marks

(iii) Kurt said, “A girl **must** have got the highest mark.”

Is Kurt correct? Explain your answer.

2 marks

DO NOT WRITE ABOVE THIS LINE

6 Single persons pay income tax on their annual earnings using the following tax rates:

On the first €8500, no tax is paid.
On the next €6000, tax is paid at the rate of 15%.
On the next €5000, tax is paid at the rate of 25%.
On the next €40 500, tax is paid at the rate of 29%.
Over €60 000, tax is paid at the rate of 35%.

Jean gets €24 700 gross annual pay and he has no other income.

(i) Work out his **annual** tax.

4 marks

(ii) Jean also needs to pay 10% national insurance on his gross salary.

Work out Jean's **weekly** national insurance contribution.

2 marks

(iii) The **weekly** net salary is the amount that remains after income tax and national insurance are deducted from the gross **weekly** salary.

Find Jean's **weekly** net salary.

3 marks

DO NOT WRITE ABOVE THIS LINE

- 7 At Wignacourt College, 560 newsletters need to be printed to be circulated amongst the students at the college. The printing costs at two printing presses, PRINTALL and COPYWORLD, are shown in the boxes below.

<p style="text-align: center;">PRINTALL</p> <p>€0.75 per newsletter for the first 240 copies plus €0.60 for each additional newsletter.</p>
--

<p style="text-align: center;">COPYWORLD</p> <p>A printing charge of €80 plus €0.55 for each newsletter.</p> <p>5% discount on the total cost</p>
--

- (i) How much does it cost to print 560 copies of the newsletter at PRINTALL?

2 marks

- (ii) Which of the two printing presses above offers the cheaper cost for 560 copies?

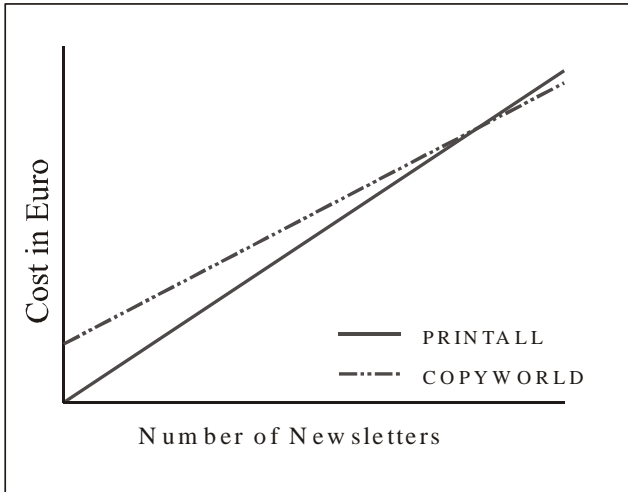
3 marks

- (iii) How many copies of the newsletter can be printed at PRINTALL for €300?

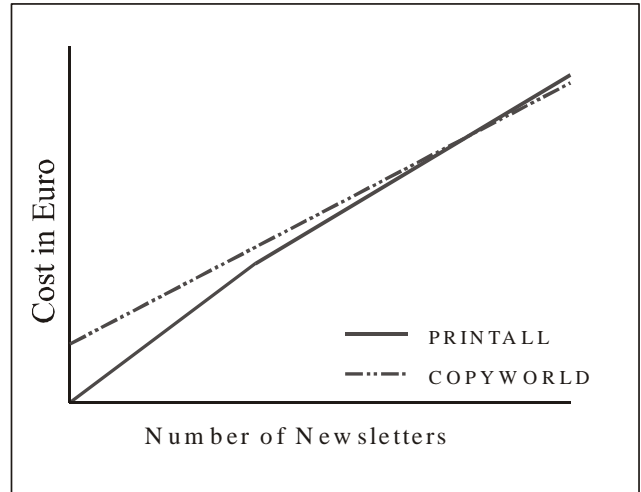
3 marks

DO NOT WRITE ABOVE THIS LINE

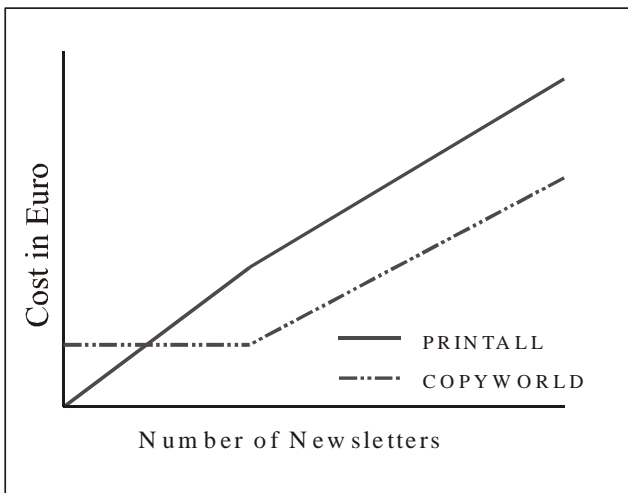
(iv) Which of the following graphs (A, B, C or D) represents the cost of printing the newsletter at PRINTALL and COPYWORLD? Explain your reasoning.



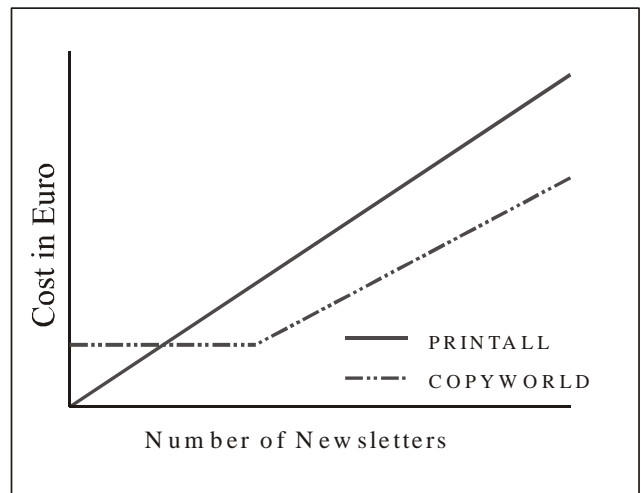
Graph A



Graph B



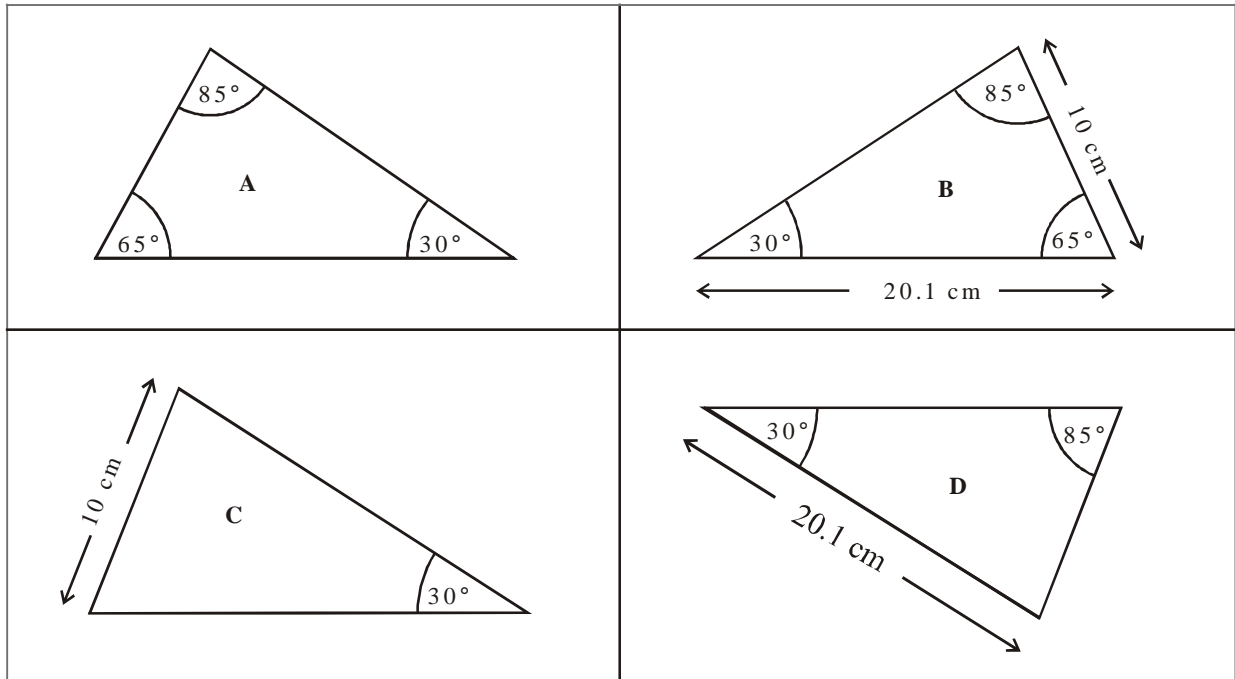
Graph C



Graph D

3 marks

8



The four triangles A, B, C and D above are **NOT** drawn to scale.

Without drawing them precisely, say which two of them are congruent. Explain your reasoning.

3 marks

DO NOT WRITE ABOVE THIS LINE

9 Think of a number. Write it in the box.

Use your number to obtain two other numbers as follows:

Rule A: Add 6 to your number, then multiply the result by 5.

Rule B: Multiply your number by 5, then add 6 to the result.

(i) Show that the difference between the two numbers you obtained is 24.

1 mark

(ii) Explain why the difference is 24 whatever number you think of.

4 marks

10 The table below gives four possible options for price reduction.

- A.** Four for the price of three
- B.** Three for the price of two
- C.** 30% reduction
- D.** Half price

Put these options in order starting with the option giving the largest reduction in prices.

Explain your reasoning.

Option	
	Largest reduction
	Least reduction

3 marks

DO NOT WRITE ABOVE THIS LINE

11a A fair dice and a fair coin are tossed together.

Find the probability that the result is a head and an even number.

3 marks

11b Tick ✓ in the appropriate cells to show whether the following statements are true or false.

Statement	True	False
When a fair dice is tossed 6 times, it will certainly land on 6 just once.		
When a fair dice is tossed 600 times, it will land on 6 around 100 times.		
When a fair dice is tossed 600 times, it will always land on 6 exactly 100 times.		
A fair dice is tossed twice. On the first toss, it lands on 6. The probability that it will land again on 6 is equal to $\frac{1}{6}$.		
A fair dice is tossed twice. On the first toss, it lands on 6. The probability that it will land again on 6 is less than $\frac{1}{6}$.		
When tossing a fair dice, it is more likely for the dice to land on 1 than on 6.		
When tossing a fair dice, it is as likely for the dice to land on 1 as it is to land on 6.		

3 marks

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

SECONDARY EDUCATION CERTIFICATE LEVEL

MAY 2014 SESSION

SUBJECT:	Mathematics
PAPER NUMBER:	IIA
DATE:	10 th May 2014
TIME:	4:00 p.m. to 6:00 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>												
Question	1	2	3	4	5	6	7	8	9	10	11	Total
Mark												

DO NOT WRITE ABOVE THIS LINE

1a Expand and simplify:

(i) $(3x + 5)(4x - 2)$

1 mark

(ii) $(2x^{\frac{3}{2}} + 1)(2x^{\frac{3}{2}} - 1)$

2 marks

(iii) $(x - 1)(x^3 + x^2)$

1 mark

1b Express as a single fraction $\frac{1}{x} + \frac{2}{x-1}$

2 marks

2a Make u the subject of the formula $p^2 = u^2 - 2st$.

3 marks

2b Solve the equation $3x^2 - 2x - 7 = 0$. Give your answers to 2 places of decimals.

4 marks

DO NOT WRITE ABOVE THIS LINE

3a Sandro opened a bank account with €10 000. His bank compounds the interest annually at an interest rate of 6% per annum.

How much interest will he earn after 5 years?

4 marks

3b The length of a shelving unit is 91 cm correct to the nearest cm.

(i) Write down the shortest and longest possible lengths of the shelving unit.

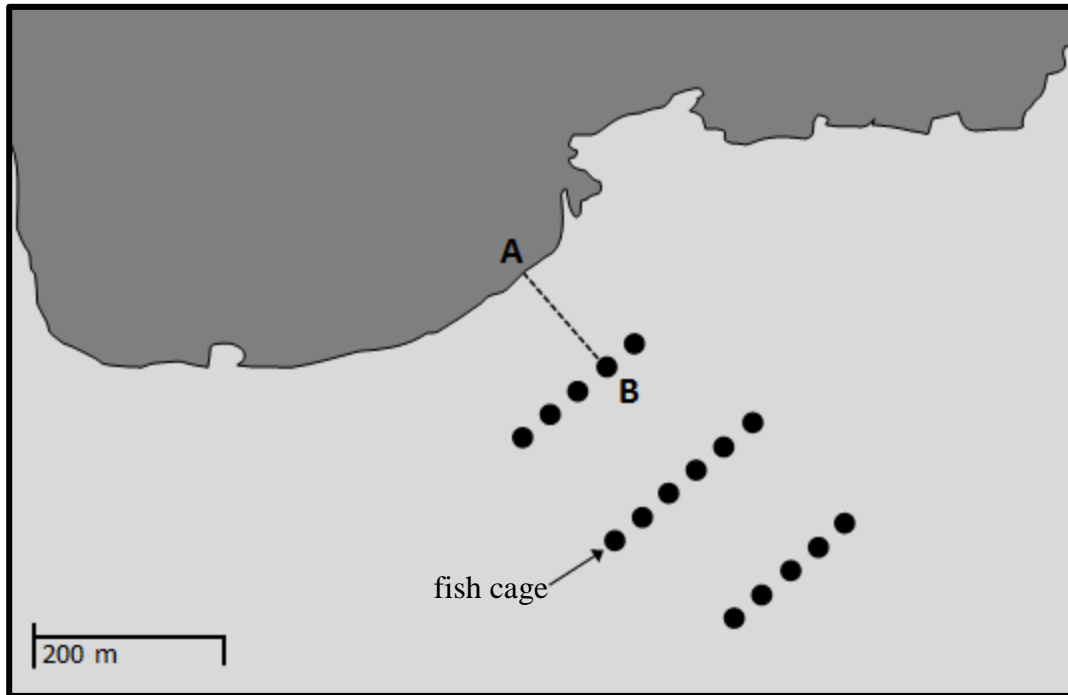
2 marks

(ii) Martina wants to place 7 such shelving units across the wall of a school library. The wall is 640 cm, measured correct to the nearest 10 cm.

Explain why it may not be possible to place 7 shelving units across the wall. Show all your working.

4 marks

- 4** A fishing company is designing a fish farm off Dawret il-Granċijiet. Sixteen fish cages are arranged as shown in the diagram below. The cylindrical cages are anchored vertically to the seabed so that their top faces are parallel to the water surface. The cages are all immersed to the same height below the sea level. The map is drawn to scale with a ratio of 1:8000.



- a.** Use the map to calculate the closest distance of the fish cages from the coast, shown by the line AB in the diagram.
- 1 mark**
- b.** The diameter of each fish cage is 20 m. Calculate the actual surface area that the sixteen fish cages cover on the sea surface. Give your answer correct to the nearest m^2 .

3 marks

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- c.** The company is considering making the following changes:

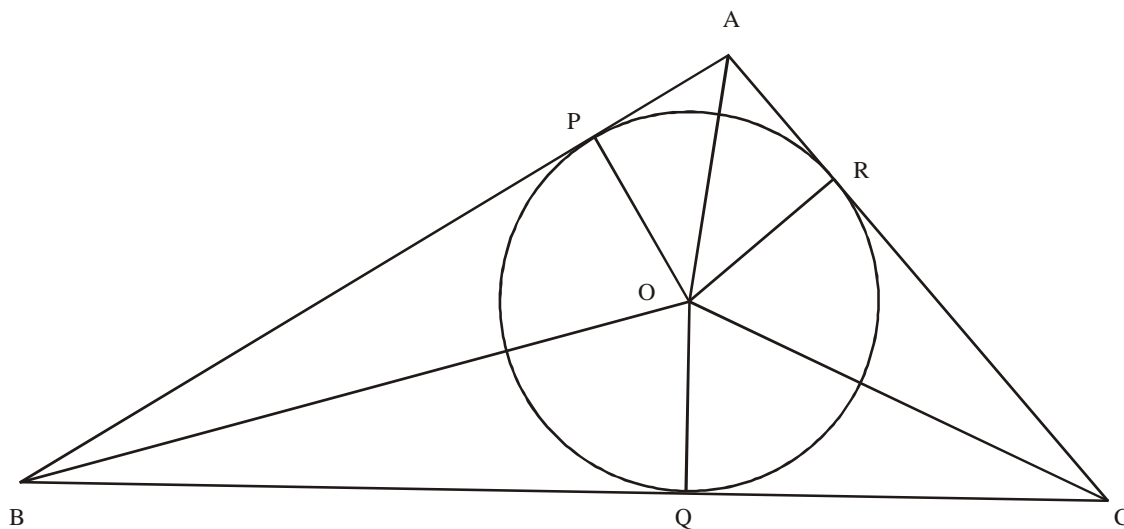
Double the diameter of each cage and half the number of cages

- (i) Will the overall sea surface area of the cages increase, decrease or remain the same? Explain your reasoning.

2 marks

- (ii) If the cages are still to be all immersed to the same height, will the overall volume of the cages increase, decrease or remain the same? Explain your reasoning.

2 marks

DO NOT WRITE ABOVE THIS LINE**5**

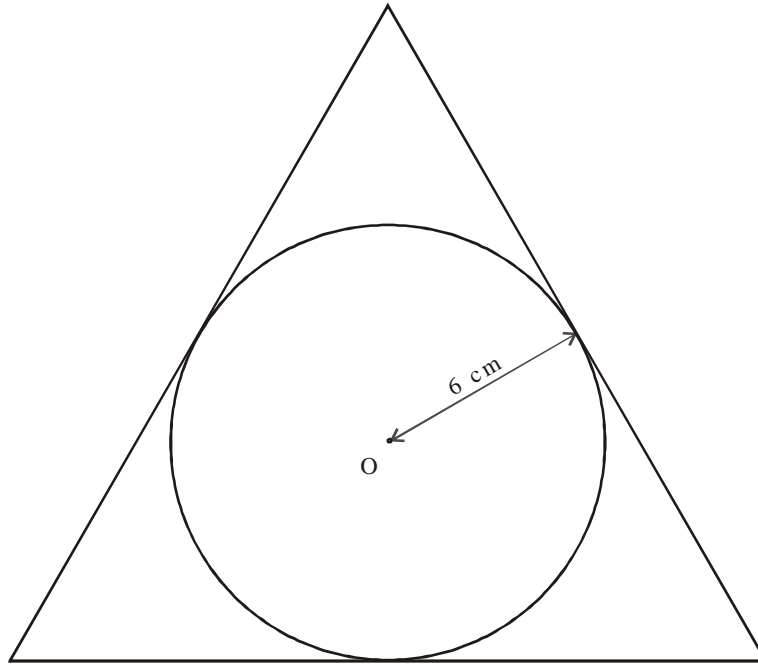
In the figure above, the sides AB, BC and AC of triangle ABC touch the circle centre O at the points P, Q and R respectively.

- (i) Prove that triangles OPB and OQB are congruent. Hence show that $\angle POB = \angle QOB$.

6 marks

- (ii) Name two other pairs of congruent triangles in the figure.

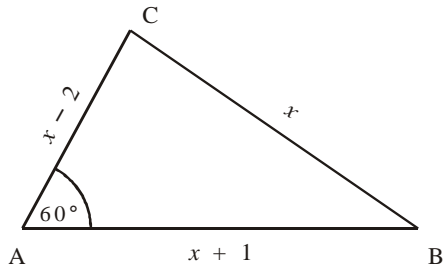
2 marks

(iii)

The figure above shows an equilateral triangle. The sides of the triangle touch a circle of radius 6 cm. Determine the length of the sides of the triangle. Show clearly your calculations. Give your answer correct to the nearest millimetre.

4 marks

6



A triangle ABC has sides AB, BC and CA of lengths $(x + 1)$ cm, x cm and $(x - 2)$ cm respectively. Angle BAC is equal to 60° .

- (i) Use the cosine rule to show that $x = 7$.

4 marks

- (ii) Find the area of triangle ABC.

3 marks

- (iii) Calculate the size of angle ABC.

3 marks

DO NOT WRITE ABOVE THIS LINE

- 7** Fresh mushrooms are grown in a farm. Some of these are dried in an oven.
A batch of fresh mushrooms weighs 5 kg.
The amount of water in these mushrooms is 92% of their weight.

(i) What is the weight of the dried mushrooms if all the water were to be removed?

2 marks

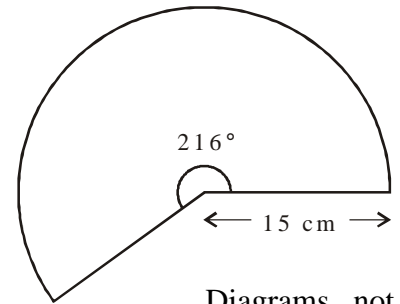
(ii) What is the weight of the mushrooms at a stage when they are partially dried and the amount of water is 60% of the total weight?

4 marks

DO NOT WRITE ABOVE THIS LINE

- 8** A piece of cardboard is cut in the form of a sector of a circle of radius 15 cm. The angle subtended at the centre is 216° .

(i) Find in terms of π , the arc length of this sector.

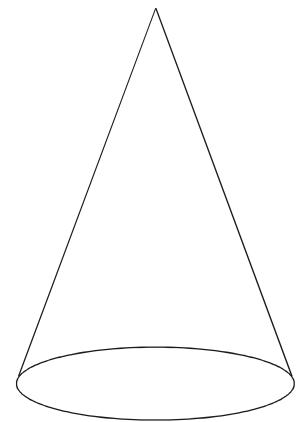


Diagrams not drawn to scale

2 marks

The straight edges are brought together to form a cone.

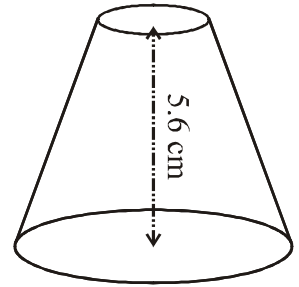
- (ii) Find the lengths of:
- (a) the radius of the base of the cone and
 - (b) the vertical height of the cone.



5 marks

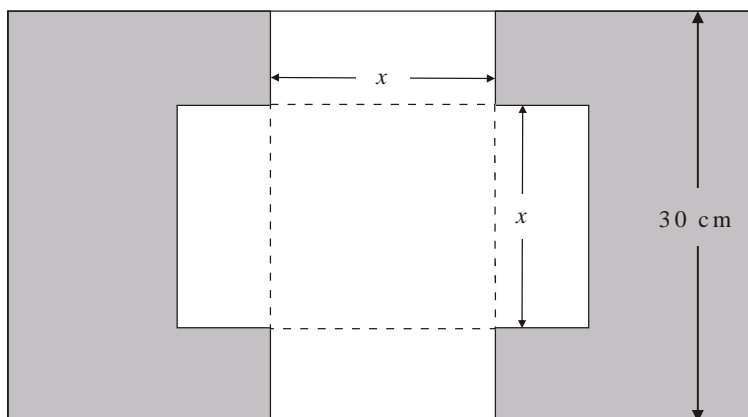
DO NOT WRITE ABOVE THIS LINE

- (iii) The cardboard is further cut to form a frustrum of height 5.6 cm. Find the radius of the smaller circular face of the frustrum.

**3 marks**

DO NOT WRITE ABOVE THIS LINE

- 9** An open box with a square base is to be made out of a sheet of cardboard, 30 cm wide, as shown in the diagram.



- (i) Let x be the length in cm of the sides of the base of the box. Write down an expression for the height of the box, in terms of x .

2 marks

- (ii) Show that the volume V of the box is given by $V = x^2 \left(15 - \frac{x}{2}\right)$.

2 marks

- (iii) Fill in the table below and plot the graph of V against x on the graph paper on page 13.

x	0	5	10	15	20	25	30
V	0	312.5	1000				

5 marks

- (iv) Use your graph to determine the largest possible volume the box can contain.

1 mark

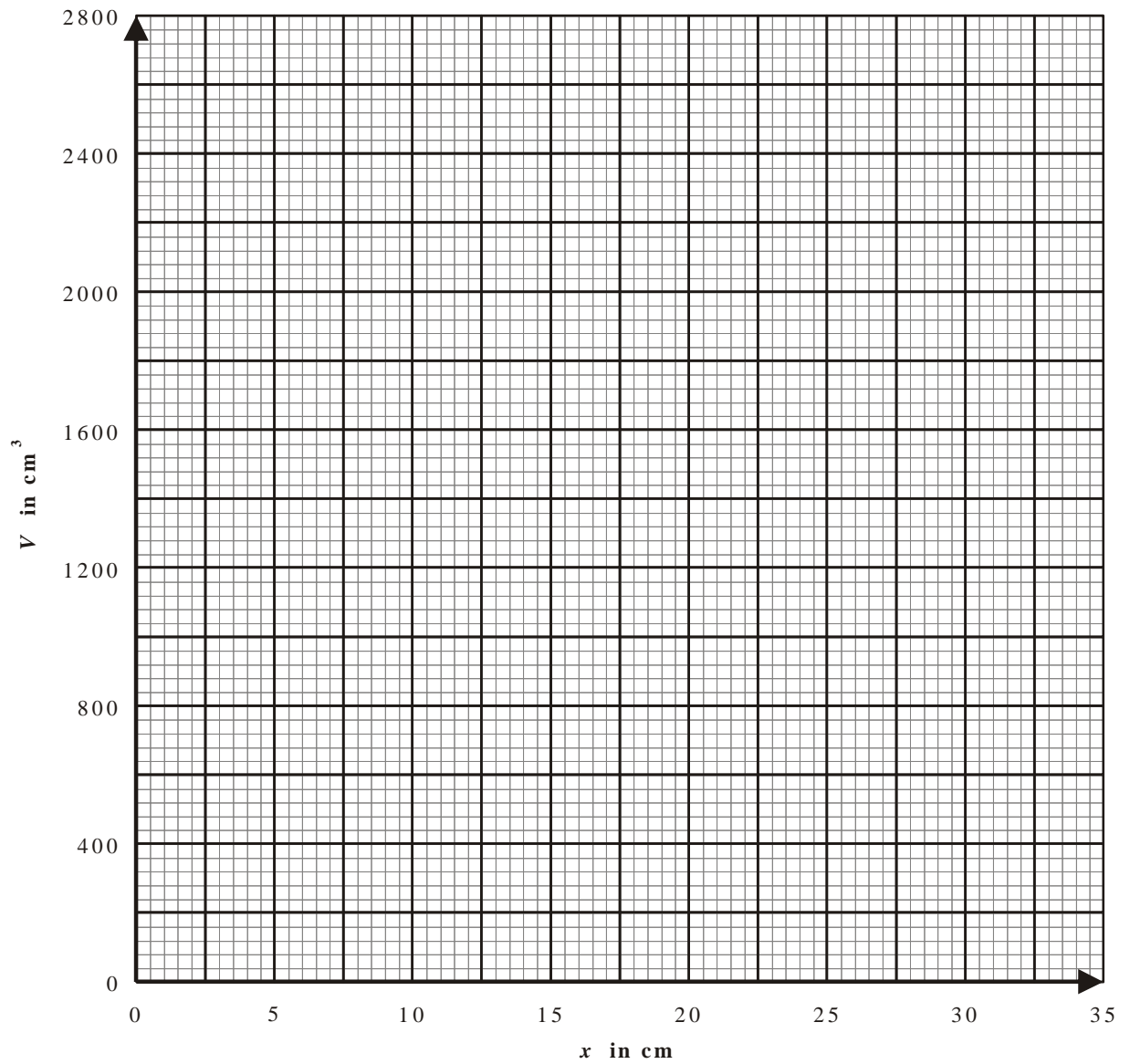
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(v) What is the height of the box when it has the largest possible volume.

1 mark

(vi) Use your graph to determine the values of x which give a value of V which is greater than 1000 cm^3 .

2 marks



DO NOT WRITE ABOVE THIS LINE

10 Elisa made a survey of the monthly amount in Euro spent on entertainment by 100 teenagers in the months of November and December. She drew a cumulative frequency graph for the amounts spent in November and a box plot for the amounts spent in December. These are shown on the next page.

- (i) Use the cumulative frequency graph to determine the median, first quartile and third quartile for the amounts spent on entertainment in November.

3 marks

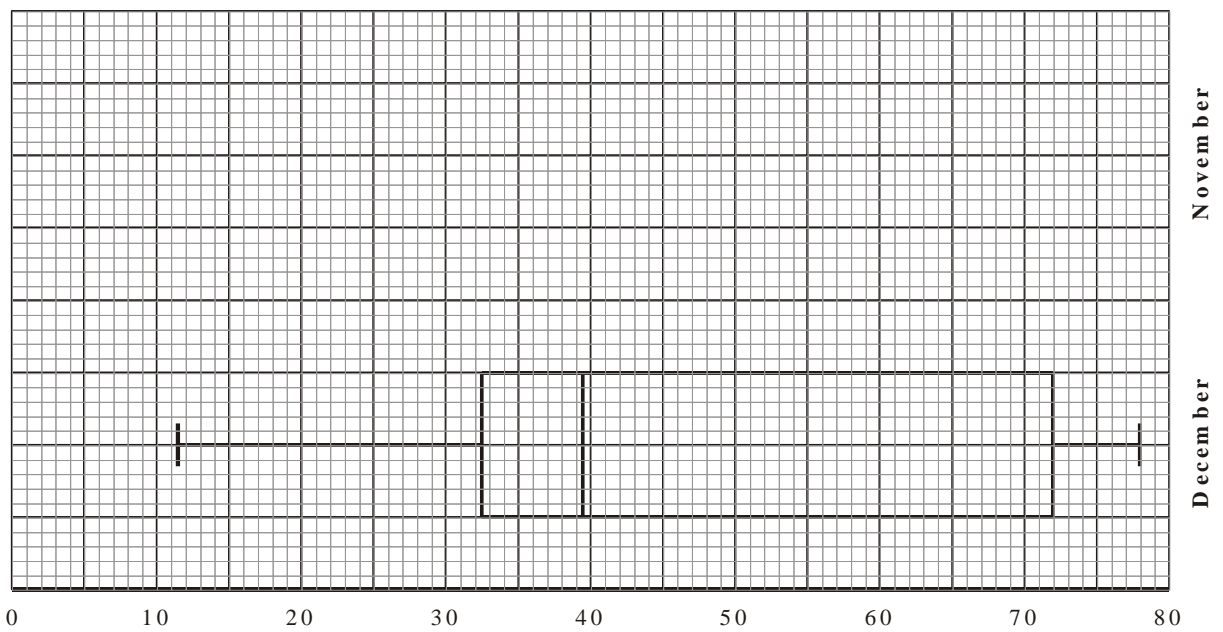
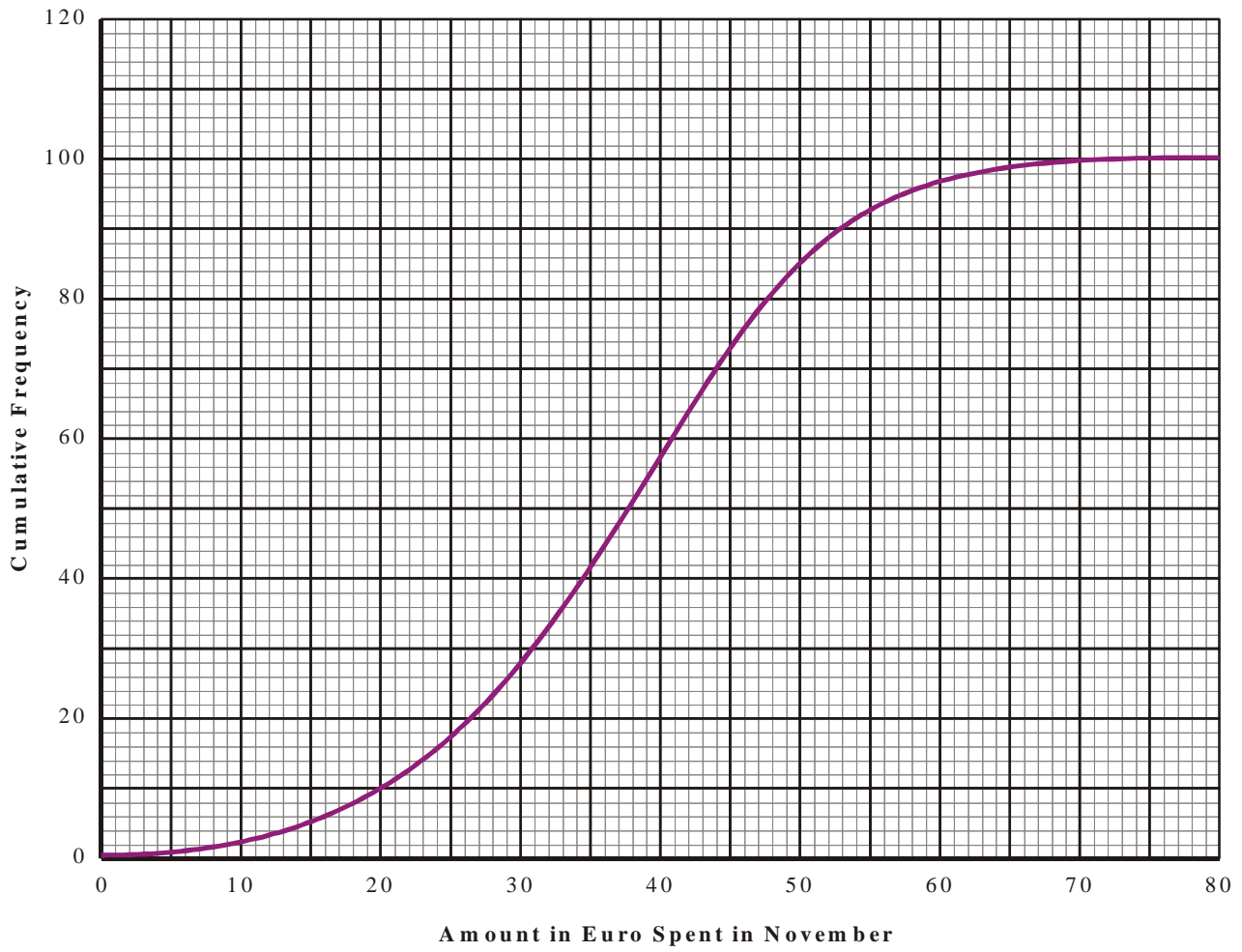
- (ii) Plot the box plot for the amounts spent on entertainment in November above the box plot shown for December.

2 marks

- (iii) Make **two** comparisons between the amounts spent on entertainment in November and December.

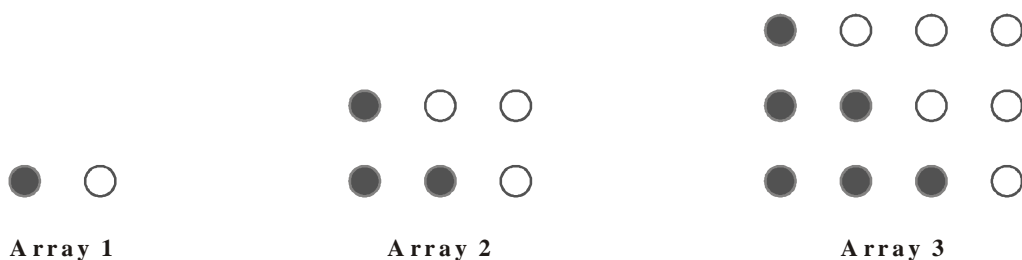
2 marks

DO NOT WRITE ABOVE THIS LINE



DO NOT WRITE ABOVE THIS LINE

11 The diagram shows the first three arrays in a pattern.



(i) How many dots are there in the fourth array in this pattern? How many of these are black?

2 marks

(ii) How many dots are there in the n^{th} array in this pattern? How many of these are black?

2 marks

(iii) For which array in this pattern are there 4950 black dots?

4 marks

(iv) In Array 3, the number of black dots can be written as $1 + 2 + 3$. Express the number of black dots in Array 7 as a sum of integers in a similar way.

1 mark

(v) What is the sum of the first 1000 integers starting from 1?

2 marks

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

SECONDARY EDUCATION CERTIFICATE LEVEL

MAY 2014 SESSION

SUBJECT: **Mathematics**
 PAPER NUMBER: **IIB**
 DATE: **10th May 2014**
 TIME: **4:00 p.m. to 6:00 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
Mark										
<hr/>										
Question No	11	12	13	14	15	16	17	18	19	20
Mark										
<hr/>										
										Total Mark

DO NOT WRITE ABOVE THIS LINE

1 Put a ✓ against the correct response to the following questions:

a. Which of the following is equal to 1 litre?

- 100 cm³ 100 cm² 1000 cm³ 1000 cm²

b. Which of the following numbers is bigger than -1 but less than 1?

- 1.78 1.78 -2.78 -0.278

c. Which of the following represents the longest time span?

- 1 day 50 000 secs 5600 mins 50 hours

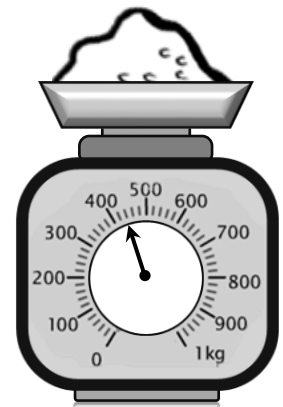
d. Which of the following measures could represent the area of a football pitch?

- 5400 m² 5400 cm² 5400 cm³ 5400 m³

4 marks

2 Keith makes apple cakes for a cake sale.

(i) Keith weighed the flour he has at home. The diagram shows the result. How much flour does he have?



1 mark

(ii) For each cake, Keith uses 125 g flour, 0.45 kg apples and 50 g butter. How many cakes can Keith make with the flour he has at home?

2 marks

(iii) What weight of apples does he need to make these cakes?

1 mark

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- 3** (i) Using ruler and compasses only construct a quadrilateral ABCD with $AB = 10$ cm, $\angle BAD = 60^\circ$, $AD = 5$ cm and $BC = CD = 7$ cm.

(ii) Measure $\angle ADC$. **4 marks**

(iii) Bisect $\angle ABC$ of the quadrilateral drawn in part (i) of this question. **1 mark**
Mark the point where the bisector meets DC as E.

(iv) Measure EC. **2 marks**

1 mark

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4 Monica works at the Malta International Airport on night shifts.

- (i) On Wednesday night, she started work at 21:45 and finished at 06:15 next morning. How long did Monica's night shift last?

2 marks

- (ii) At 23:30 Monica received a phone call from her brother who lives in Beijing. Malta is six hours behind Beijing. What time was it in Beijing when her brother called her?

2 marks

5 Last week, Julian took part in a cycling competition.

- (i) The cycling track was 40 km long. Julian took 80 minutes to complete his ride. Calculate his average speed in km/h during this ride.

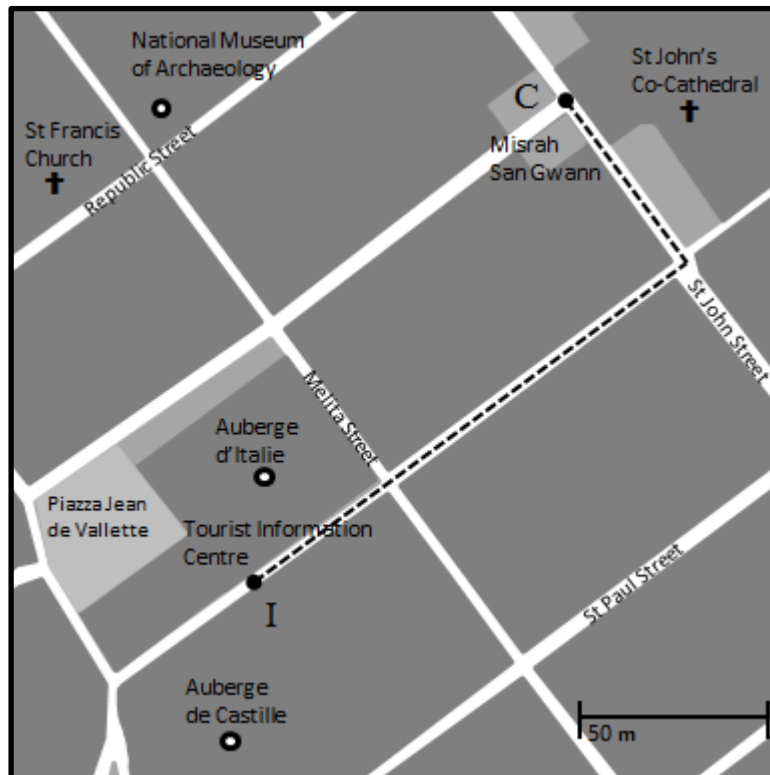
2 marks

- (ii) Another cycling competition is being organised on a cycling track which is 60 km long. How many minutes will it take Julian to finish the competition if he now cycles at an average speed of 32 km/h?

3 marks

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- 6 The diagram below is taken from a street map of Valletta and is drawn to the scale shown on the map.



- (i) What distance on the ground is represented by 1 cm on the map?

2 marks

- (ii) Calculate the walking distance from the Tourist Information Centre (marked I on the map) to Misrah San Gwann (marked C on the map).

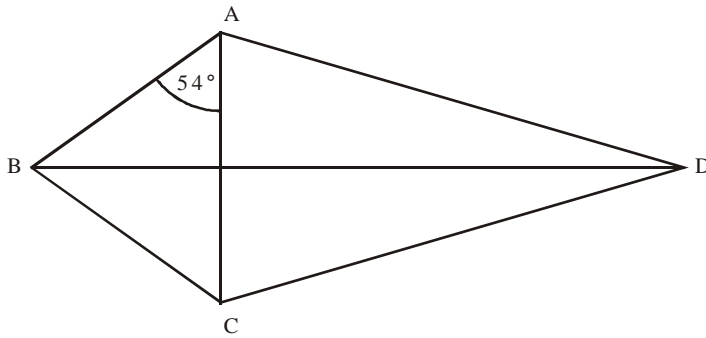
2 marks

- (iii) Janet walks from the Tourist Information Centre to Misrah San Gwann at an average speed of 5 km per hour. How long does it take her to walk this distance? Give your answer to the nearest minute.

3 marks

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7a



The diagram shows a kite ABCD where BD is the line of symmetry. The angle BAC is 54° . Find the value of angle ABC showing your working.

2 marks

7b Work out the size of the interior angles of a regular 12-sided polygon. Show your working.

3 marks

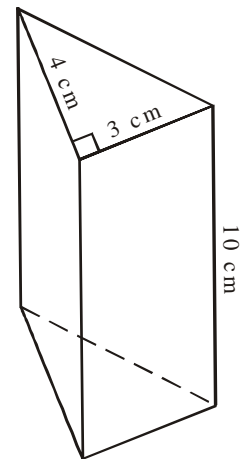
8 A storekeeper tested a sample of 1000 bulbs. He found that $\frac{1}{25}$ of his sample were defective. What is the ratio of defective to non-defective bulbs? Express your ratio in its simplest form.

2 marks

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- 9 Joanna wants to make a **closed** cardboard box in the shape of a prism as shown in the diagram. The uniform cross-section of the prism is a right angled triangle whose two perpendicular sides are of lengths 3 and 4 cm. The prism is 10 cm high.

Sketch the shape Joanna needs to cut which when folded gives this prism. On your sketch, show all the measurements Joanna will need so as to draw the shape accurately. You do NOT need to draw the shape to scale.

**4 marks**

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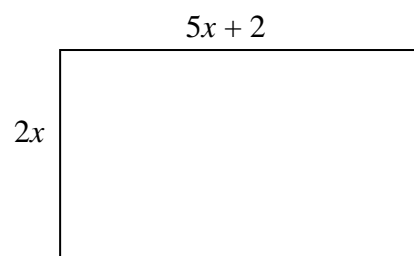
- 10** Martha and Albert went into a cafeteria. Martha bought 3 cheesecakes and 2 blueberry muffins which cost her €4.80. Albert bought 8 cheesecakes and 5 blueberry muffins which cost him €12.40.

Work out the cost of a cheesecake and the cost of a blueberry muffin.

4 marks

- 11** A rectangle has length $(5x + 2)$ cm and width $2x$ cm.

- (i) Find an expression in terms of x that represents the perimeter of this rectangle.



1 mark

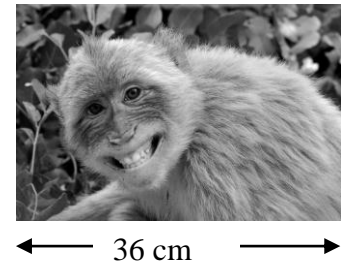
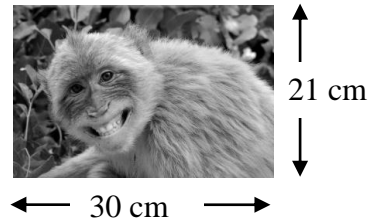
- (ii) If the perimeter of this rectangle is 32 cm, what are the lengths of its sides?

3 marks

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12 Janet enlarged the photo to get a larger similar picture as shown at the side.

- (i) The photo is 21 cm high and 30 cm wide. The larger picture is 36 cm wide. What is the height of the larger picture?

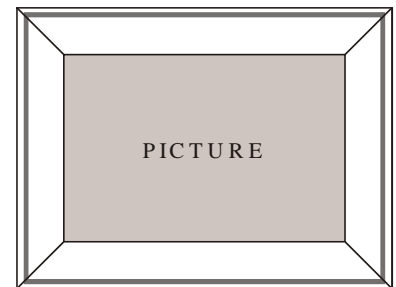


Pictures and diagram are not to scale

2 marks

- (ii) Janet would like to frame the **larger picture** as shown. The frame is to be cut from a long rectangular strip of framing that is 3 cm wide and 140 cm long.

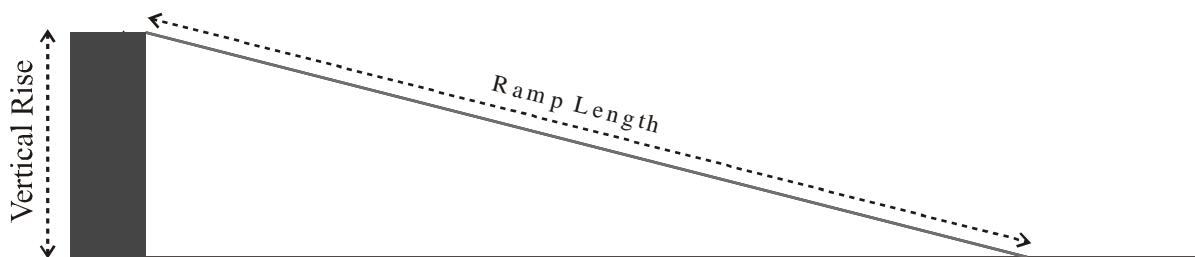
She does not want the frame to cover any part of the picture. Does she have enough length of framing? Show your working.



3 marks

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- 13** The steepness of a ramp depends on the vertical rise and on the ramp length.



Which of the two ramps below is steeper? Explain your reasoning.

- A.** A ramp with a vertical rise of 15 cm and a ramp length of 2 m.
B. A ramp with a vertical rise of 30 cm and a ramp length of 3 m.

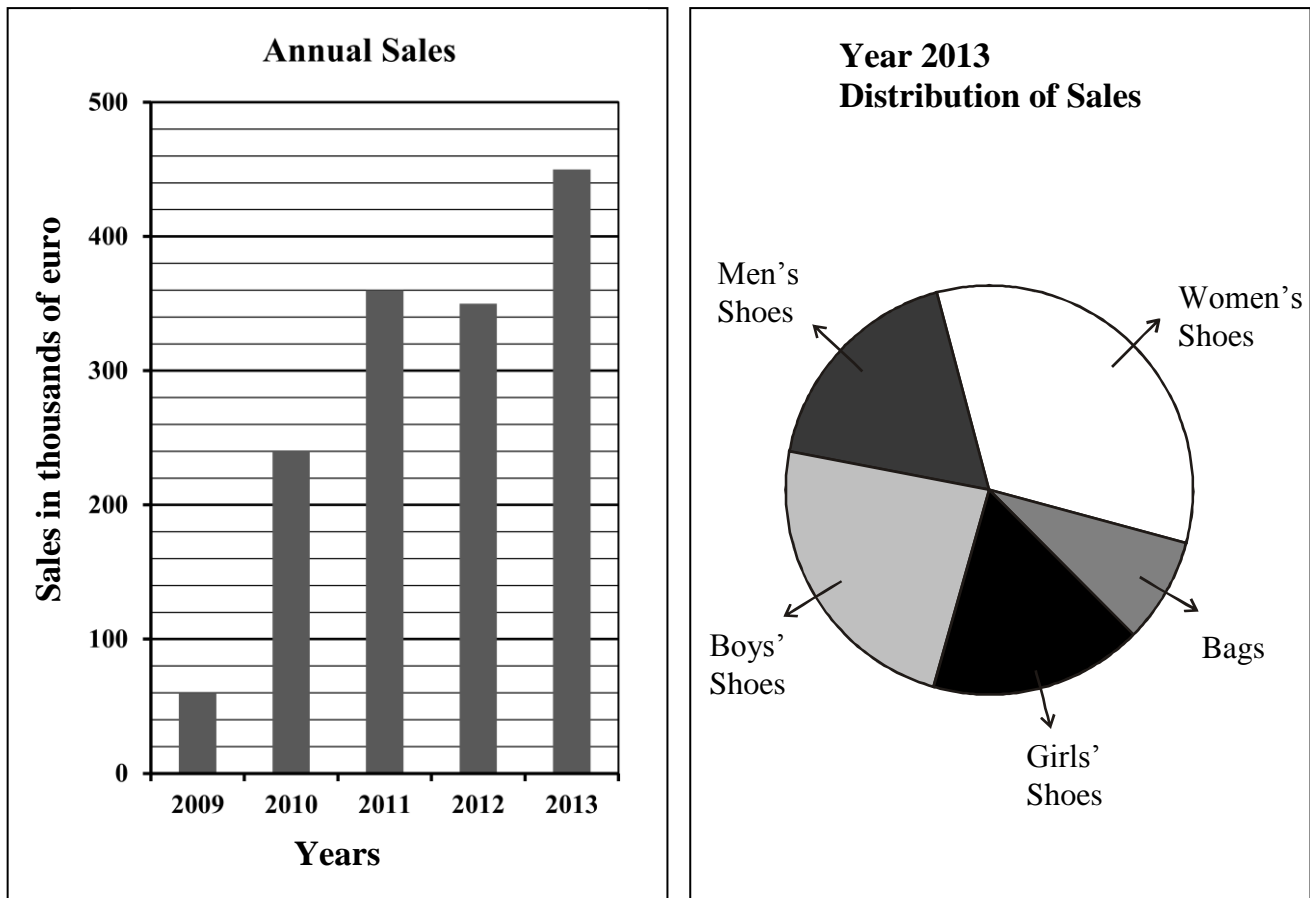
3 marks

- 14** A bag contains 6 yellow beads and a number of green beads. When a bead is selected at random, the probability that a yellow bead is selected is $\frac{2}{5}$. How many green beads are in the bag?

2 marks

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- 15** The Bar Chart represents the annual sales of a shoe shop for the years 2009-2013.
The Pie Chart shows the distribution of sales for the year 2013 into five categories.



- (i) During which year was the least amount of sales registered? State the amount of sales during this year. **1 mark**
- (ii) Work out the mean annual sales for the last three years. **2 marks**
- (iii) Use both charts to determine the amount of sales of women's shoes in 2013. **3 marks**
- (iv) What percentage of the 2013 sales came from bags? **2 marks**

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16 The volume V of a sphere is given by $V = \frac{4}{3}\pi r^3$.

(i) Determine the volume to the nearest cubic centimetre of a sphere of radius 5 cm.

2 marks

(ii) What is the radius of a sphere of volume 2000 cm^3 ? Give your answer to the nearest millimetre.

4 marks

17 In March a clothes shop reduced all its prices by 40%. A suit cost €150 before the sale.

(i) What is the cost of this suit in March?

2 marks

(ii) In April, the clothes' prices are further reduced by 30% of the prices in March. Franco buys this suit in April. How much does this suit cost him?

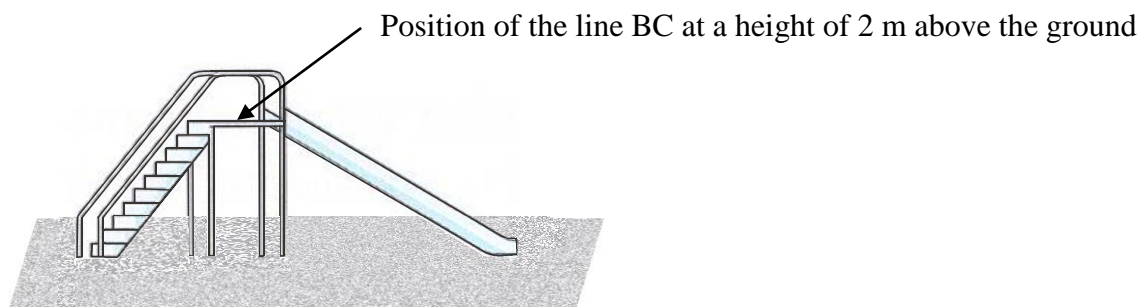
2 marks

(iii) What percentage reduction did Franco get on the original price before the March sale?

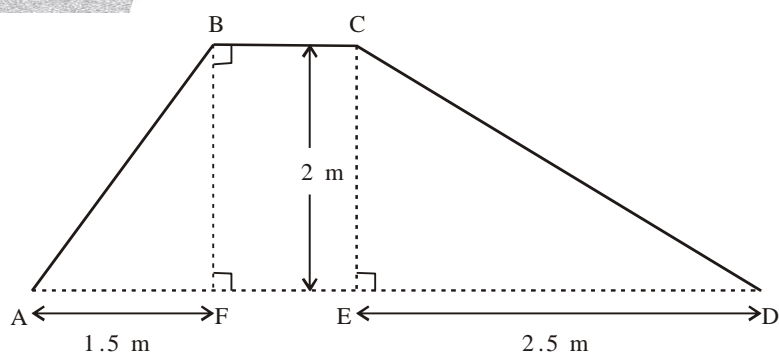
2 marks

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- 18 The diagrams below represent a slide in a children's playground. The steps and the slide are represented by AB and CD respectively and they rise to a height of 2 m above the ground. The length of AF is 1.5 m and that of ED is 2.5 m.



Diagrams are not drawn to scale.



- (i) Calculate the angle of inclination of the steps, shown by $\angle BAF$ in the diagram above.

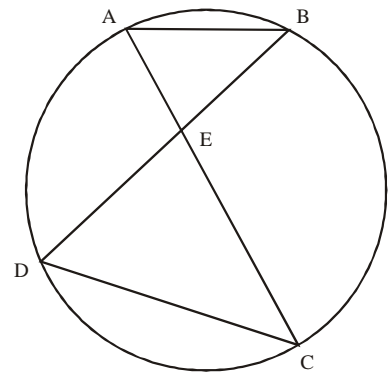
3 marks

- (ii) Calculate the length of the slide CD.

3 marks

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19 A, B, C and D are four points on the circumference of a circle.
The lines AC and BD intersect at E.



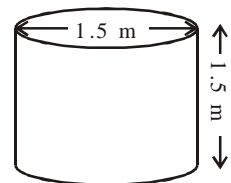
(i) Prove that triangles ABE and DCE are similar.

3 marks

(ii) If $BE = 6$ cm, $DE = 8$ cm, $AE = 3$ cm, find the length of AC.

3 marks

20 A water tank is in the shape of a cylinder. Its diameter and height are both equal to 1.5m.



(i) Calculate the volume of the tank, in m^3 , correct to 2 decimal places.

3 marks

(ii) A flat rectangular roof measures 11 m by 8 m. Rainwater from the roof drains into this cylindrical tank. How many centimetres of rainfall just fill the tank?
Give your answer to one decimal place.

4 marks

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