L-Università ta' Malta

MATRICULATION AND SECONDARY EDUCATION
CERTIFICATE EXAMINATIONS BOARD

**SECONDARY EDUCATION CERTIFICATE LEVEL
2021 SUPPLEMENTARY SESSION**

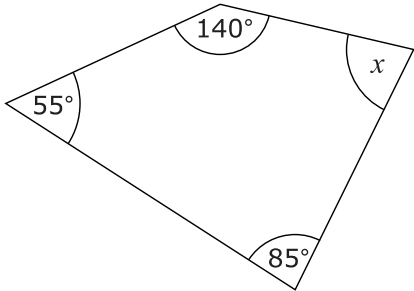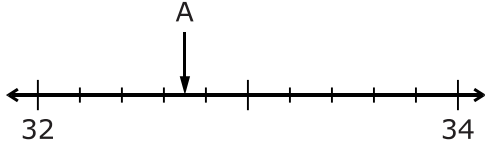| SUBJECT:	**Mathematics**	PAPER:	I – Section A (Non-Calculator Section)
DATE:	2nd October 2021	TIME:	20 minutes

Attempt **ALL** questions.

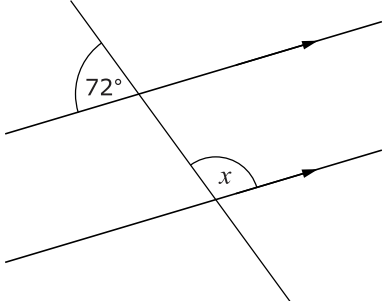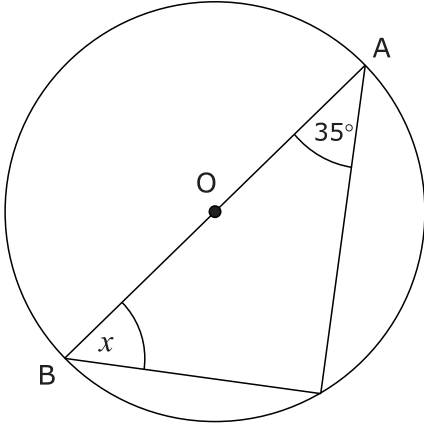Write your answers in the space available on the examination paper.
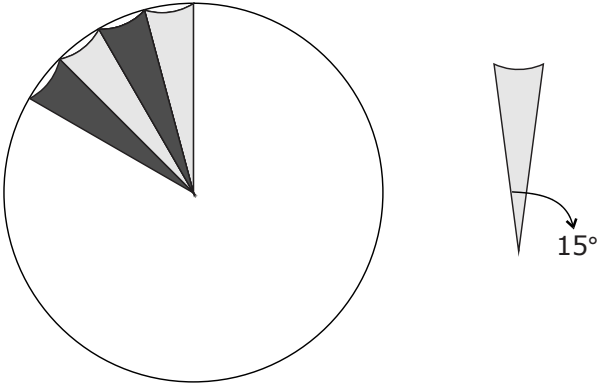The use of calculators and protractors is **not** allowed.
It is not necessary to show your working.
This paper carries a total of 20 marks.

QUESTIONS AND ANSWERS ALL QUESTIONS CARRY ONE MARK	SPACE FOR ROUGH WORK (IF NECESSARY)
1 Round 1.3567 to 2 significant figures. **Ans** _____	
2 A letter is chosen at random from the word MATHEMATICS. What is the probability of choosing a letter T? **Ans** _____	
3 In the quadrilateral below, work out the size of the angle x. 140° / x / 55° / 85° *Diagram not drawn to scale* **Ans** _____	
4 Work out an approximate answer for: $$\frac{29.93 \times 31.04}{1.95}$$ **Ans** _____	

QUESTIONS AND ANSWERS ALL QUESTIONS CARRY ONE MARK	SPACE FOR ROUGH WORK (IF NECESSARY)
5 What is the reading at point A? A 32 34 **Ans** _____	
6 Work out the circumference of a circle of diameter 14 m. In your calculation, use $\pi = \dfrac{22}{7}$. **Ans** _____	
7 Calculate the surface area of a cube of side 4 cm. **Ans** _____	
8 Work out the missing value: 324 + 324 = _____ × 6	
9 Increase €46.40 by 10%. **Ans** _____	
10 Expand and simplify: $x(3x^2 + 2y) - 2xy$ **Ans** _____	
11 Find the value of p if $p + q = 2$ and $5p - q = 46$ **Ans** _____	

DO NOT WRITE ABOVE THIS LINE

QUESTIONS AND ANSWERS ALL QUESTIONS CARRY ONE MARK	SPACE FOR ROUGH WORK (IF NECESSARY)
12 What is the size of the angle marked x? 72° x Ans _____	
13 Work out: (9 × 24) + (11 × 24) Ans _____	
14 Using 99 × 37 = 3663, find the value of: 33 × 3.7 Ans _____	
15 AB is a diameter of the circle centre O. Find the value of the angle marked x. A 35° O *Diagram not drawn to scale* x B Ans _____	
16 Make c the subject of the formula: $E = mc^2$ Ans _____	

SEC23/1a.21s

QUESTIONS AND ANSWERS ALL QUESTIONS CARRY ONE MARK	SPACE FOR ROUGH WORK (IF NECESSARY)
17 Which of the following statements is FALSE: (a) 5 is a prime number (b) 5 < 9 (c) 5 is a multiple of 25 (d) 5 is twice 2½ (e) 5 is not a square number **Ans** _____	
18 Drinks cost d cents each and sandwiches cost s cents each. I buy 5 drinks and 4 sandwiches. What does $5d + 4s$ stand for? **Ans** _____	
19 Following an enlargement, a picture 1.8 cm long becomes 5.4 cm long. By what scale factor is the picture enlarged? **Ans** _____	
20 Kay is making a design within a circle. Grey and black equal sections are placed in turn, without overlap, so as to leave no gaps at the centre. The diagram shows the position of the first four sections of the design. How many grey sections are needed to cover the whole circle? **Ans** _____	

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MATRICULATION AND SECONDARY EDUCATION CERTIFICATE
EXAMINATIONS BOARD

SECONDARY EDUCATION CERTIFICATE LEVEL
2021 SUPPLEMENTARY SESSION

SUBJECT:	**Mathematics**
PAPER NUMBER:	I – Section B (Calculator Section)
DATE:	2nd October 2021
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 of mathematical instruments is allowed.

Candidates are allowed to use transparencies for drawing transformations.

This paper carries a total of 80 marks.

Sec A	1	2	3	4	5	6	7	8	9	10	Total

1   Sam earns €8.50 per hour. If he does overtime, he is paid 1.5 his usual rate.
    His normal working week is 40 hours.

    (a) What is Sam's wage for a week when he works for 50 hours?

(3)

    (b) On one particular week, Sam earned €531.25.
         How many hours did he work in that week?

(3)

(Total: 6 marks)

2   The table below shows the daily noon temperature, in degrees Celsius, at a particular place
    in Malta during the last week of April.

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
17	17.5	18	17.5	16.5		16

    (a) The mean temperature for that week was 17°C.
         What was the temperature on Saturday?

(3)

(b) Calculate the median noon temperature for this week.

(2)

(c) Find the range in temperature.

(1)

(Total: 6 marks)

3
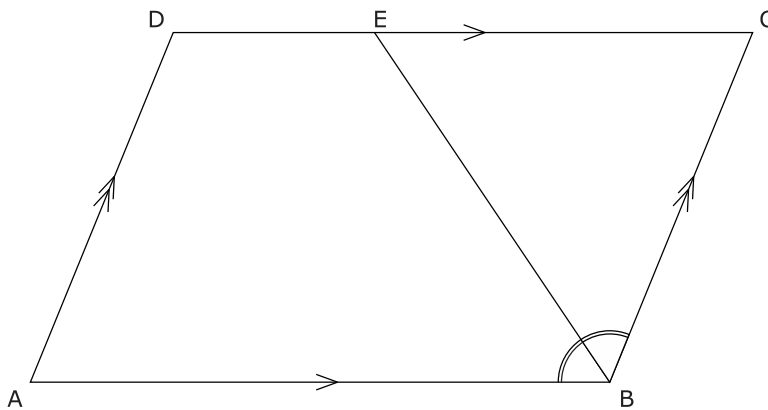
Diagram not drawn to scale

ABCD is a parallelogram. The bisector of angle ABC meets CD at E.

(a) Complete the statements below:

(i) Angle BEC equals angle _____ because _____

(2)

(ii) Triangle BCE is _____ because _____

(2)

(iii) Quadrilateral ABED is called a _____ (1)

(b) If angle ADC = 115º, find the size of the following angles.
Give a reason for each answer.

(i) Angle DAB;

(2)

(ii) Angle BED.

(2)

(Total: 9 marks)

4   Gianni wants to send a gift to each of his two grandchildren, Abel and Diane, who live in England.

Postage is calculated as follows:
- €1.85 for the first 100 g
- €0.30 for every additional 20 g

(a) Abel's gift weighs 1320 g. Calculate the postage costs on Abel's gift.

(3)

(b) The postage cost on Diane's gift amounts to €10.55.
How much does Diane's gift weigh?

(3)

(c) Abel and Diane live in the same house.
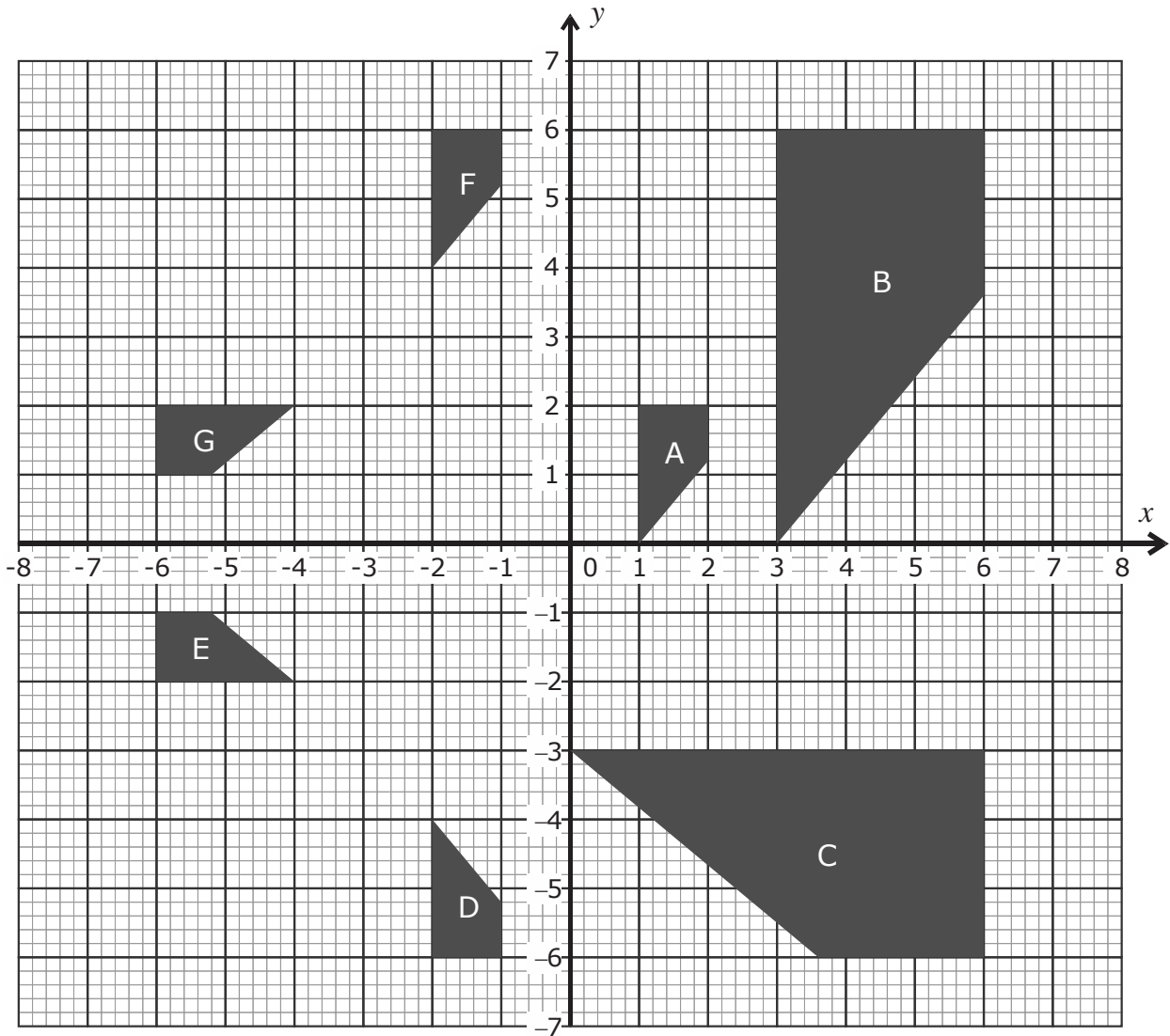By how much is it cheaper for Gianni to send both gifts in one parcel?

(3)

(Total: 9 marks)

5

y

F

B

G

A

x

-8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8

E

C

D

Use the diagram above to fill in the empty cells of the following table.

Object	Transformation	Image	
A	Enlargement by scale factor of 3 about (0, 0)		(1)
B	Rotation by 90º clockwise about (0, 0)		(1)
E	Reflection in the line $y = x$		(1)
A	Translation by $\begin{pmatrix} -3 \\ 4 \end{pmatrix}$		(1)
F	Rotation by 90º anticlockwise about (0 , 0)		(1)
F		A	(2)
E		G	(2)

(Total: 9 marks)

6   The diagram below shows the uniform cross-section of a swimming pool.
    The end AE is 2.1 m deep whilst the end BC is 1 m deep.

Diagram not drawn to scale
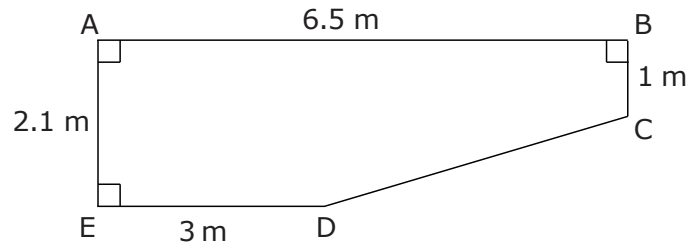
(a) Using the information in the diagram, find:

     (i)   the length of DC;

                                                                                   (3)

     (ii) the area of the uniform cross-section of the pool.

                                                                                   (3)

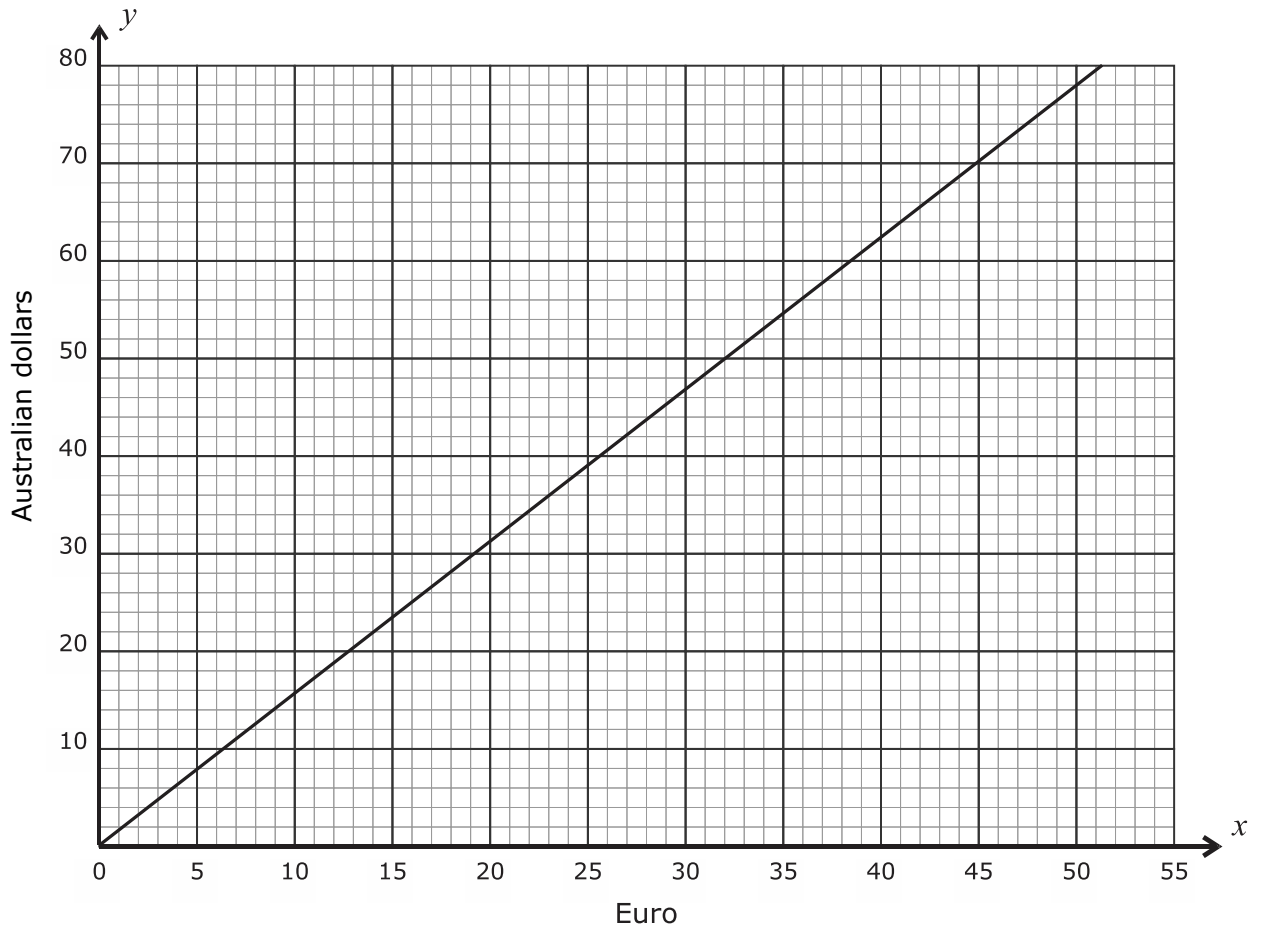(b) If the width of the pool is 4.6 m, find the volume of water it takes to fill the pool.

                                                                                   (2)

                                                                    (Total: 8 marks)

7   The graph below is used to convert between Euro and Australian dollars.

(a) Use the graph to change:

(i)   €45 to Australian dollars   _____   (1)

(ii) 25 Australian dollars to Euro   _____   (1)

(b) Find the gradient of this line.

(2)

(c) Give the equation of this line.

(2)

(d) 1 Australian dollar = 5.05 Chinese Yuan.
     Change €500 to Chinese Yuan.

(3)

(Total: 9 marks)

8   Giovanna sells bread items in the form of ftira, baguette and ciabatta from her bakery.

On Monday:

The ratio of baguette to ftira sold was 2:5.

The ratio of ftira to ciabatta sold was 4:7.

(a) What is the ratio of baguette : ftira : ciabatta sold on Monday?

(3)

(b) On Monday, Giovanna sold 56 baguettes.
     Work out the total number of bread items she sold.

(3)

(Total: 6 marks)

9 Figures A and B show two rectangular shapes.
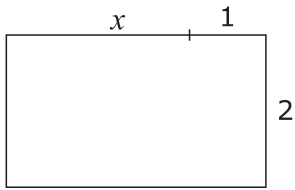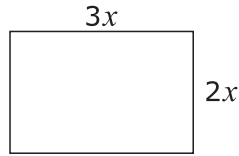Figure C is L-shaped and has rectangular arms.
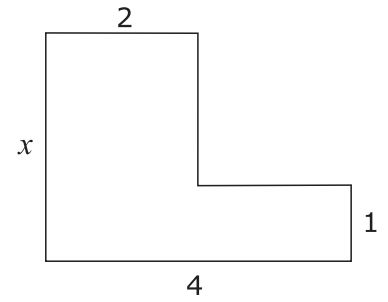
Figure A   Figure B   Figure C

(a) Determine the perimeter of each figure in terms of x.
Simplify your answer as much as possible.

_____   _____   _____
Perimeter Figure A   Perimeter Figure B   Perimeter Figure C

(4)

(b) Determine the area of each figure in terms of x.
Simplify your answer as much as possible.

_____   _____   _____
Area Figure A   Area Figure B   Area Figure C

(4)

(Total: 8 marks)

10 Samira buys separate bags of Brazil nuts, pecan nuts, peanuts and raisins.
The varieties come in bags as follows:

Weight and Price per Bag		
Variety	**Amount**	**Price**
Brazil nuts	1 kg	€27.90
Pecan nuts	2 kg	€36.40
Peanuts	3 kg	€17.88
Raisins	3 kg	€26.94

Samira mixes all four varieties to form boxes of mixed nuts and raisins.
She prepares a 10 kg mixture, with equal amounts from each variety.

(a) Calculate the cost of the 10 kg mixture.

(4)

This 10 kg mixture is used to fill boxes containing 125 g and 350 g.
Samira fills twenty 350 g boxes and puts the remaining mixture in the 125 g boxes.

(b) How many 125 g boxes does she fill?

(3)

The cost of all the empty boxes and decorating ribbon amounts to €28.50.
Samira sells the 125 g boxes for €3.65 and the 350 g boxes for €8.80.

(c) Work out the profit made on the sale of **all** the boxes.

(3)

(Total: 10 marks)

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L-Università ta' Malta

SUBJECT:	**Mathematics**
PAPER NUMBER:	IIB
DATE:	2nd October 2021
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 of mathematical instruments is allowed.

Candidates are allowed to use transparencies for drawing transformations.

This paper carries a total of 100 marks.

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Question No	1	2	3	4	5	6	7	8	9	10
Mark										

Question No	11	12	13	14	15	16	17	18	19	20
Mark										

Total Mark

1   The following are statements about some measures. In each case, underline the unit of measure which makes sense in real life situations.

   (a)   The capacity of a wine glass is 200 (litres, millilitres, cubic metres, grams).

   (b)   A boy is 155 (metres, centimetres, feet, inches) tall.

   (c)   A sack of potatoes weighs 2.5 (grams, kilograms, litres, tonnes).

   (d)   An egg weighs 57 (grams, milligrams, tonnes, millilitres).

   (e)   A room is 290 (metres, millimetres, centimetres, kilometres) high.

(Total: 5 marks)

2   (a)   On a particular day the temperature in Helsinki dropped from $4\,°C$ to $-6\,°C$.
          By how many degrees Celsius did the temperature drop?

(1)

   (b)   Complete the sequence:

          -10.5, -8, -5.5,   _____ ,   _____

(2)

(Total: 3 marks)

3   (a)   Find the value of $s = \dfrac{2a-3b}{c}$ when $a = 5$, $b = 2$ and $c = -5$.

(2)

   (b)   Factorise:

          (i) $3x + 6$

(1)

          (ii) $p^2 + pt$

(1)

(Total: 4 marks)

4

scalene triangle	regular pentagon	square	circle
equilateral triangle	regular hexagon	octagon	kite

From the list above, name a shape which **must**:

(a) have rotational symmetry of order 3;

_____ (1)

(b) have more than 6 lines of symmetry;

_____ (1)

(c) also be a rhombus;

_____ (1)

(d) have both obtuse and acute interior angles;

_____ (1)

(e) have interior angles of 108º.

_____ (2)

(Total: 6 marks)

5   Jacqui is organising a fund-raising marathon which will last 24 hours.

Six bands will each play a 2¼ hours music gig. Three comedians will each present a 1½ hour show. Two solo singers will each give a 1¾ hour concert. Jacqui still needs to find artists to perform during the remaining time of the marathon.

How long is the remaining time of the marathon?

(Total: 5 marks)

6   A computer store has a sale. It is offering discounted prices on some of its items.

(a)   A set of headphones cost €180. During the sale, its price is reduced by 16%.
      Calculate the sale price of the headphones.

(3)

(b)   The price of a gaming monitor is reduced from €250 to €220 during the sale.
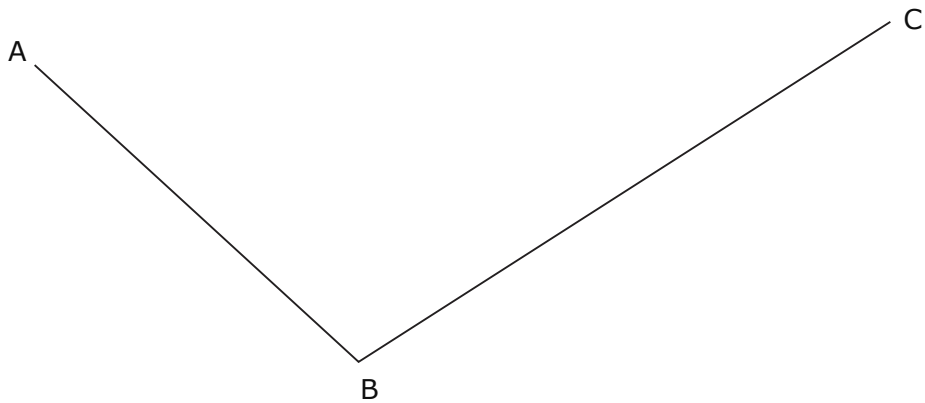   What is the percentage price reduction on this item?

(3)

(Total: 6 marks)

7   **In this question use ruler and compasses only.**

(a)   Construct the bisector of angle ABC.

(2)

(b)   Construct the perpendicular bisector of the line BC.

(2)

(c)   Mark the point of intersection of the two bisectors as point D.

(1)

(d)   Measure the length of AD.

(1)

(Total: 6 marks)

8   The student council of St Mary's College consists of:
          two females: Anna and Beth, and
          three males: Chris, David and Eric.

     The student council of St Joseph's College consists of:
          three females: Fleur, Greta and Helen and
          two males: Ian and John.

     (a)   A member from each student council is chosen to take part in a seminar about Ecology.
            Complete the possibility space for this event.

		St Mary's Council				
	Members	Anna	Beth	Chris	David	Eric
St Joseph s Council	Fleur	A, F				
	Greta					
	Helen					
	Ian					
	John					

(3)

     (b)   What is the probability that:

            (i)   the two chosen students are of the same sex?

            (ii)   at least one of the two chosen students is a female?

(3)

(Total: 6 marks)

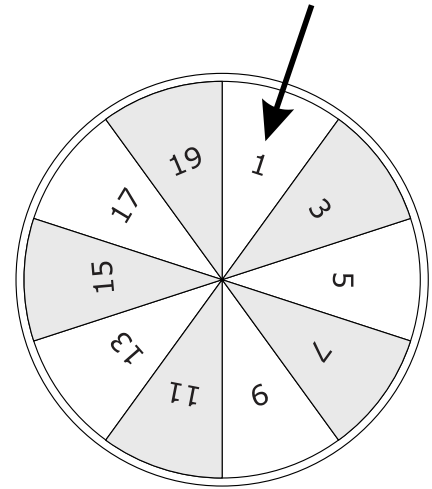9   (a)   Expand and simplify: $x - 5(3x - 2)$.

(2)

     (b)   Make x the subject of the formula $y = 4x - 7$.

(2)

(Total: 4 marks)

10 This spinner is being used at a school fair.

On spinning, the pointer can land on each
sector with the same probability.

What is the probability that the pointer lands on:

(a) an odd number?

(1)

(b) a multiple of 5?

(1)

(c) a prime number?

(1)

(d) a factor of 45?

(1)

(Total: 4 marks)

11 When a stone is thrown vertically upwards with a particular velocity, the distance s above the
ground, after t seconds is given by the formula:
$$s = 25t - 5t^2$$

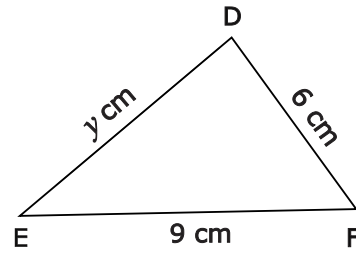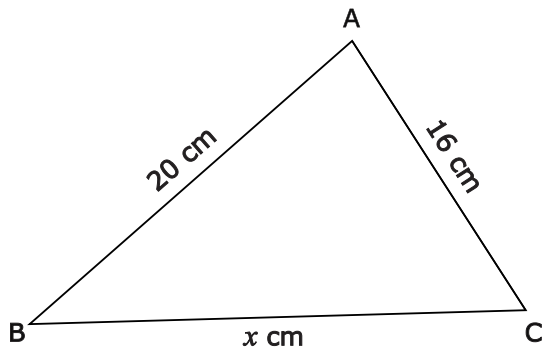(a) How high is the stone above the ground after 2 seconds?

(1)

(b)   How high is the stone above the ground after 4 seconds?

(1)

(Total: 2 marks)

12 Triangles ABC and DEF are similar with ∠BAC = ∠EDF and ∠ABC = ∠DEF.

Diagram not drawn to scale

Calculate the values of x and y.

(Total: 6 marks)

13 Amy is 25 years older than Bill. Let x be Bill's present age.

(a) Write Amy's present age in terms of x.

(1)

In 5 years time Amy will be twice as old as Bill.

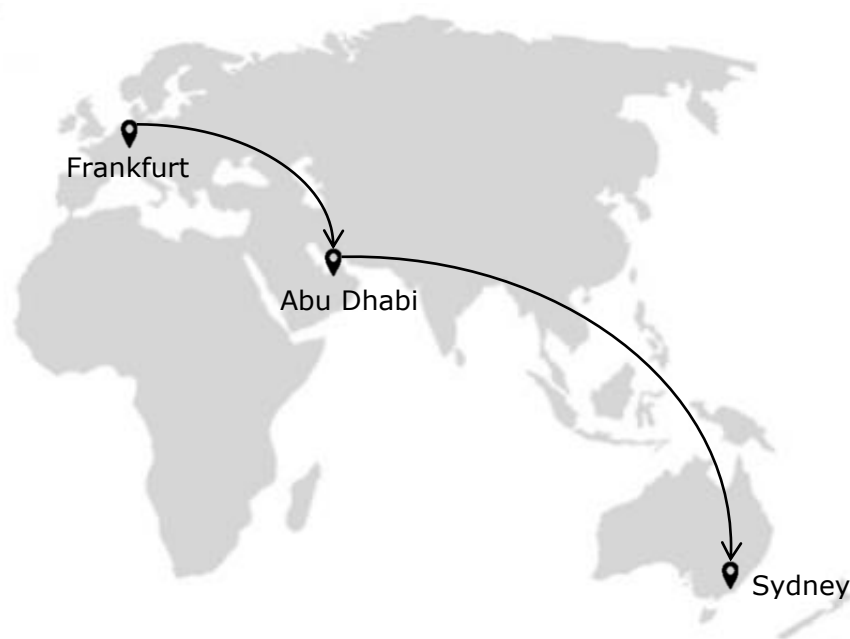(b) Use the above information to write an equation in x.

(3)

(c) Work out Bill's and Amy's present ages.

(2)

(Total: 6 marks)

14   Etienne is travelling from Frankfurt to Sydney by plane via Abu Dhabi.

(a)   His flight from Frankfurt leaves at 13:50 and arrives at Abu Dhabi at 22:05, both local times. If Abu Dhabi is two hours ahead of Frankfurt, calculate the length of this flight in hours and minutes.

(2)

(b)   Two hours later he leaves for Sydney. This flight is 13 hrs 35 minutes long. If Abu Dhabi is six hours behind Sydney, at what local time will Etienne reach his final destination?
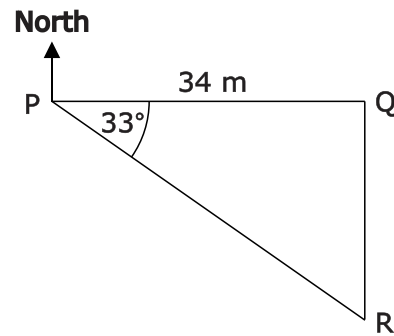
(3)

(Total: 5 marks)

DO NOT WRITE ABOVE THIS LINE

15   Three poles are positioned at P, Q and R, as shown in the diagram.

Q is 34 m due east of P.
∠QPR = 33⁰.
R is south of Q.

Diagram not drawn to scale

(a)   Explain why ∠PQR is 90⁰.

(1)

(b)   What is the bearing of R from P?

(1)

(c)   What is the bearing of P from R?
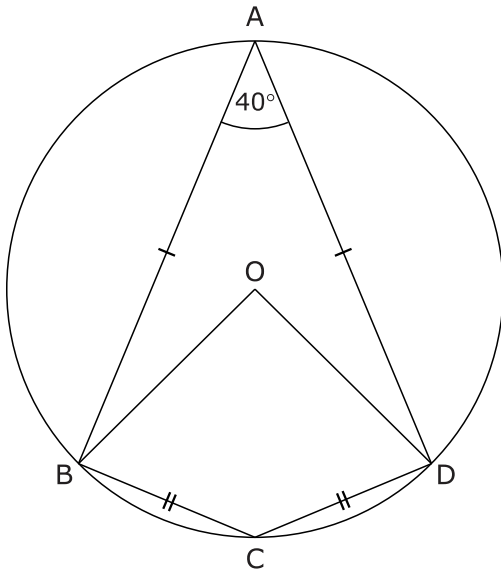
(2)

(d)   Calculate the distance PR.

(3)
(Total: 7 marks)

16   The diagram shows a kite ABCD inscribed in a circle centre O. Angle BAD = 40º.

Diagram not drawn to scale

(a)   What is the size of angle BOD? Explain your reasoning.

(2)

(b)   What is the size of angle BCD? Explain your reasoning.

(2)
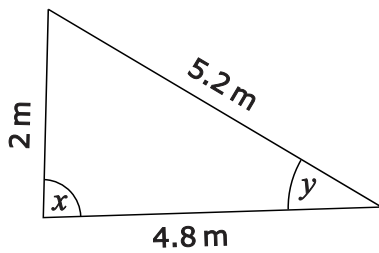
(c)   Why is AC a diameter of the circle?

(2)

(Total: 6 marks)

17   The diagram shows the dimensions of a triangular lawn.

Diagram not drawn to scale

(a)   Show that angle x is a right-angle.

(3)

(b)   Find the value of angle y correct to one decimal place.

(3)

(Total: 6 marks)

18   (a)   Show that the point (4, 5) lies on the line $y = 2x - 3$.

(1)

(b)   Write down the gradient of the line $y = 2x - 3$.

(1)

(c) Write down the equation of the line parallel to $y = 2x - 3$ and passing through the point (0, 5).

(2)

(Total: 4 marks)

19 Anna, Bertha and Carla competed in a 40 kilometre bicycle ride.

Anna was the fastest and she averaged a speed of 30 kilometres per hour.
Bertha took 5 minutes more than Anna.
Carla took 7 minutes more than Bertha.

(a) How much time did they each take to complete the ride?

Cyclist	Time taken to complete the ride
Anna	
Bertha	
Carla	

(3)

(b) Work out Bertha's speed in kilometres per hour correct to one decimal place.

(2)

(Total: 5 marks)

20 Team A and Team B are each composed of the same number of students.

Each member of the two teams took part in a 1500 metre race.

The mean time taken by the Team A students to finish the race was 6 minutes 5 seconds.

The mean time of the Team B students was 5 minutes 54 seconds.

Which **TWO** statements about the competition **must** be true?

Mark these statements by ticking the adjacent cells with a ✓ .

(a) Each student in Team B ran faster than any student in Team A.

(b) The student who ran fastest was in Team B.

(c) The student who was slowest was in Team A.

(d) As a group, Team A was slower than Team B.

(e) For each student in Team A, there was a student in Team B who ran faster.

(f) The total time taken for the race by the Team A students is larger than the total time taken by the Team B students.

(g) The median time taken by the Team B students to finish the race was larger than that of the Team A students.

(Total: 4 marks)

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