



**Coimisiún na Scrúduithe Stáit**  
*State Examinations Commission*

**JUNIOR CERTIFICATE**

**EXAMINATION**

**2010**

**MARKING SCHEME**

**MATHEMATICS**

**FOUNDATION LEVEL**

## MARKING SCHEME

### GENERAL GUIDELINES FOR EXAMINERS

1. Penalties of three types are applied to candidates' work as follows:

- Blunders - mathematical errors/omissions (-3)
- Slips- numerical errors (-1)
- Misreadings (provided task is not oversimplified) (-1).

Frequently occurring errors to which these penalties must be applied are listed in the scheme. They are labelled: B1, B2, B3,..., S1, S2,..., M1, M2,...etc. These lists are not exhaustive.

2. When awarding attempt marks, e.g. Att(3), note that

- any *correct, relevant* step in a part of a question merits at least the attempt mark for that part
- if deductions result in a mark which is lower than the attempt mark, then the attempt mark must be awarded
- a mark between zero and the attempt mark is never awarded.

3. Worthless work is awarded zero marks. Some examples of such work are listed in the scheme and they are labelled as W1, W2,...etc.

4. The phrase “hit or miss” means that partial marks are not awarded – the candidate receives all of the relevant marks or none.

5. The phrase “and stops” means that no more work is shown by the candidate.

6. Special notes relating to the marking of a particular part of a question are indicated by an asterisk. These notes immediately follow the box containing the relevant solution.

7. The sample solutions for each question are not intended to be exhaustive lists – there may be other correct solutions.

8. Unless otherwise indicated in the scheme, accept the best of two or more attempts – even when attempts have been cancelled.

9. The *same* error in the *same* section of a question is penalised *once* only.

10. Particular cases, verifications and answers derived from diagrams (unless requested) qualify for attempt marks at most.

11. A serious blunder, omission or misreading results in the attempt mark at most.

12. Do not penalise the use of a comma for a decimal point, e.g. €5.50 may be written as €5,50.

## QUESTION 1

<b>Part (a)</b>	<b>10(5, 5) marks</b>	<b>Att(2, 2)</b>
<b>Part (b)</b>	<b>20(5, 5, 5, 5) marks</b>	<b>Att(2, 2, 2, 2)</b>
<b>Part (c)</b>	<b>20(15, 5)marks</b>	<b>Att (5, 2)</b>

**Part (a)** **10(5, 5) marks** **Att(2, 2)**

Find the value of:

(i)  $35 - 7 =$

(ii)  $35 \div 7 =$

**(a)** **10(5, 5) marks** **Att(2, 2)**

(i)  $35 - 7 = 28$

(ii)  $35 \div 7 = 5$

\* No penalty for work not shown: no ✍

\* If answers to (i) and (ii) interchanged, blunder once only in part (i)

*Blunders (-3)*

B1 Uses incorrect operator with work.

*Slips (-1)*

S1 Numerical errors, once each part

*Misreadings (-1)*

M1 + instead of  $\div$  in (ii)

*Attempts (2)*

A1 Special cases: 42 (+), 5 ( $\div$ ), 245 (x), -28 ( $7 - 35$ ) without work in (i)

A2 Special cases: 245 (x),  $\frac{1}{15}$  or 0.2 ( $\div$  reversed), 28 (-) without work in (ii) but see \* above.

*Worthless (0)*

W1 Incorrect answer without work, but check M1, A1, A2.

**Part (b)**

**20(5, 5, 5, 5) marks**

**Att(2, 2, 2, 2)**

**(b) (i)**

**5 marks**

**Att 2**

**(i)**

List all the factors of 8

**(b) (i)**

**5 marks**

**Att 2**

1, 2, 4, 8

*\* No penalty for work not shown: no ✍*

*Slips (-1)*

S1 Omitted factor.

*Misreadings (-1)*

M1 Multiples given instead of factors.

*Worthless (0)*

W1 No factor or multiple of 8.

**(b) (ii)**

**5 marks**

**Att 2**

**(ii)**

List all the factors of 12

**(b) (ii)**

**5 marks**

**Att 2**

1, 2, 3, 4, 6, 12

*\* No penalty for work not shown: no ✍*

*Slips (-1)*

S1 Omitted factor.

*Misreadings (-1)*

M1 Multiples given instead of factors.

*Worthless (0)*

W1 No factor or multiple of 12.

**(b) (iii)**

**5 marks**

**Att 2**

**(iii)**

List all the factors that are common to both 8 and 12.

**(b) (iii)**

**5 marks**

**Att 2**

1, 2, 4

\* No penalty for work not shown: no ✍

\* Accept use of candidate's answers from (b) (i) and/or (b) (ii).

*Slips (-1)*

S1 Common factor omitted.

*Worthless (0)*

W1 Previously unused number, not a factor or multiple of 8 or 12.

**(b) (iv)**

**5 marks**

**Att 2**

**(iv)**

Write down the Highest Common Factor (HCF) of 8 and 12.

**(b) (iv)**

**5 marks**

**Att 2**

HCF = 4

\* No penalty for work not shown: no ✍

\* Accept candidate's highest number from (b)(iii) or highest common number from (b)(i) and (b)(ii).

*Misreadings (-1)*

M1 Least Common Multiple given.

*Worthless (0)*

W1 Previously unused number, not a factor or multiple of 8 or 12

**Part (c)****20(15, 5) marks****Att(5, 2)**

(i) You buy a number of items in a shop. They are listed below. Find the total cost of these items.

3 Apples	@	€0.35 each.
2 Fruit Drinks	@	€1.29 each.
4 Packets of Crisps	@	€0.45 each.
3 Bread Rolls	@	€0.55 each.

(ii) You use a €10 note to pay for the items which you bought. How much change will you get?

**(c) (i)****15 marks****Att 5**

(i) You buy a number of items in a shop. They are listed below. Find the total cost of these items.

3 apples at €0.35 each.	= €1.05
2 large bottles of Coke at €1.29 each.	= €2.58
4 packets of crisps at €0.45 each.	= €1.80
3 bread rolls at €0.55 each	= €1.65
<b>Total</b>	<b>= €7.08</b>

$$3 \times 0.35 = 1.05 \text{ or } 1\frac{1}{20}$$

$$2 \times 1.29 = 2.58 \text{ or } 2\frac{29}{30}$$

$$4 \times 0.45 = 1.80 \text{ or } 1\frac{4}{5}$$

$$3 \times 0.55 = 1.65 \text{ or } 1\frac{13}{20}$$

Accept fractions in subtotals

$$\text{Total} = €7.08$$

\*Accept improper fractions or mixed numbers for subtotals.

\*Accept answer in cents.

*Blunders (-3)*

- B1 Correct answer, without work (✗)
- B2 Ignores multiples of items shown (once only) (does not perform any multiplication) answer 2.64.
- B3 Each item omitted from total (each time).
- B4 Fails to add subtotals.
- B5 Incorrect operator with work.

*Slips (-1)*

- S1 Final total left as an improper fraction or mixed number.
- S2 Arithmetic error in calculation (each time to a maximum of -3 marks).
- S3 Decimal error (each time to a maximum of -3 marks).
- S4 Incorrect multiples of items shown (each time to a maximum of -3 marks).

*Misreadings (-1)*

- M1 Error in copying component.

*Attempts (5)*

- A1 Any attempt at multiplication/addition. [Evidence of operation – only one correct digit written down].
- A2 Answer with correct digits but incorrect decimal location (with no work) e.g. 70800

*Worthless (0)*

- W1 Incorrect answer without work subject to A2.

**(c) (ii)**

**5 marks**

**Att 2**



$$10.00 - 7.08 = 2.92$$

Change is €2.92

- \* Accept candidate's answer from (i).
- \* No penalty for omission of € symbol.
- \* Accept answer in cents.

*Blunders (-3)*

- B1 Correct answer without work. ✍
- B2 Adds instead of subtracts.
- B3 Order of subtraction reversed, but  $7.08 - 10.00 = 2.92$  full marks.

*Slips (-1)*

- S1 Arithmetic error in calculation (once only).
- S2 Misplaced decimal (once only).

*Misreadings (-1)*

- M1 Error in copying digits (once only).

*Attempts (2)*

- A1 Answer from (i) written in this part.

*Worthless (0)*

- W1 Incorrect answer without work.



## QUESTION 2

<b>Part (a)</b>	<b>10 marks</b>	<b>Att 3</b>
<b>Part (b)</b>	<b>20(5, 15) marks</b>	<b>Att(2, 5)</b>
<b>Part (c)</b>	<b>20 marks</b>	<b>Att 7</b>

**Part (a)** **10 marks** **Att 3**

**(a)** Write down the mode of the following numbers.

4, 6, 2, 6, 5, 6

**(a)** **10 marks** **Att 3**

Mode = 6

\*Accept correct answer without work: no ✍

*Blunders (-3)*

- B1 Correct frequency table constructed and stops.
- B2 Calculates mean

*Slips (-1)*

- S1 Each incorrect or omitted entry in Frequency Table ( maximum -3)

*Attempts (3)*

- A1 “three” written or 3 or “most common number.”
- A2 Tries to find mean, with work.
- A3 Numbers rearranged in ascending/descending order.
- A4 29/6 or 4.8 given as answer (mean) without work.

*Misreadings (-1)*

- M1 Error in copying down digit

*Worthless (0)*

- W1 Incorrect answer without work, but see A1 and A4

Part (b)

20(5, 15) marks

Att(2, 5)

(b) The following table shows the number of trees of different types in a small park.

Type of Tree	Oak	Birch	Chestnut	Willow	Beech
Number	9	12	6	9	4



(b) (i)

5 marks

Att 2

(i) Calculate the total number of trees in the park.

(b) (i)

5 marks

Att 2

~~✍~~

$$9+12+6+9+4 = 40 \text{ trees}$$

\* Ignore excess work.

*Blunders (-3)*

B1 Correct answer without work. (~~✍~~)

B2 No total.

*Slips (-1)*

S1 Each incorrect or omitted entry, minimum 3 numbers added. Otherwise attempt mark only.

S2 Error in addition.

*Misreadings (-1)*

M1 Error in copying down digit.

*Attempts (2)*

A1 Selects any two of 9, 12, 6, 9, 4.

A2 Any effort at a Bar Chart or Trend Graph.

A3 8 or 5 or 40/5 without work.

*Worthless (0)*

W1 Incorrect answer without work.


W2 Selects at most one of A1 above.

W3 Any other incorrect number.

(b) (ii)

15 marks

Att 5

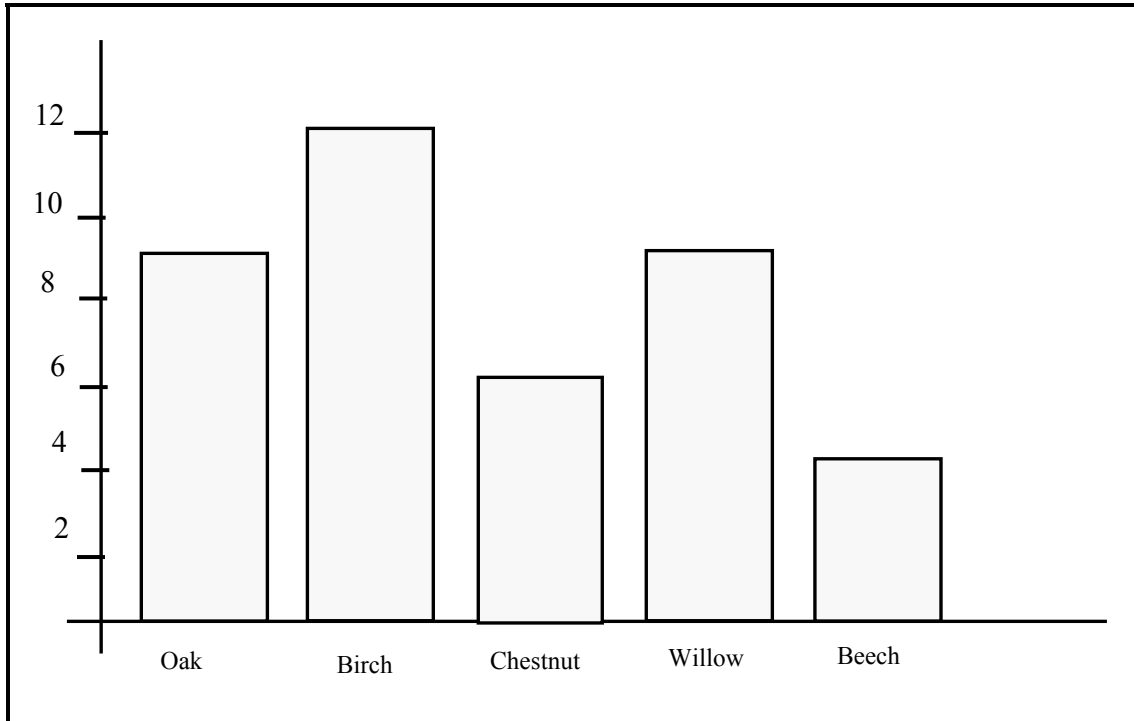
(ii)  Draw a bar chart to represent the number of each type of tree.

Use the grid below to draw your bar chart.

(b) (ii)

15 marks

Att 5



- \* Accept correct graph with no labels.
- \* Accept horizontal or vertical bar chart.
- \* Accept bars of unequal widths or bars joined as a histogram.
- \* Accept lines for bars.

*Blunders (-3)*

- B1 Axis with tree numbers not graduated uniformly.
- B2 Draws a trend graph or pie chart.

*Slips (-1)*

- S1 Each incorrect bar outside of tolerance. Tolerance  $\pm \frac{1}{2}$ cm,  $\pm 1$  box (to the eye) to max (-3).
- S2 Each bar omitted to a maximum of (-3)

*Attempts (5)*

- A1 Draws one or both axes.

**Part (c)**

**20 marks**

**Att7**

- (c) 120 people were asked how many hours, on average, they spent using the internet in a week.  
The table shows the results.



Number of hours	2 hours	3 hours	4 hours	5 hours
Number of people	10	20	60	30

We wish to show this information on a pie chart.

**Complete the table:**

Number of hours	2 hours	3 hours	4 hours	5 hours
Number of people	10	20	60	30
Number of degrees		60°		

**Draw the pie chart**

(c)

**20 marks**

**Att 7**

Complete the table:

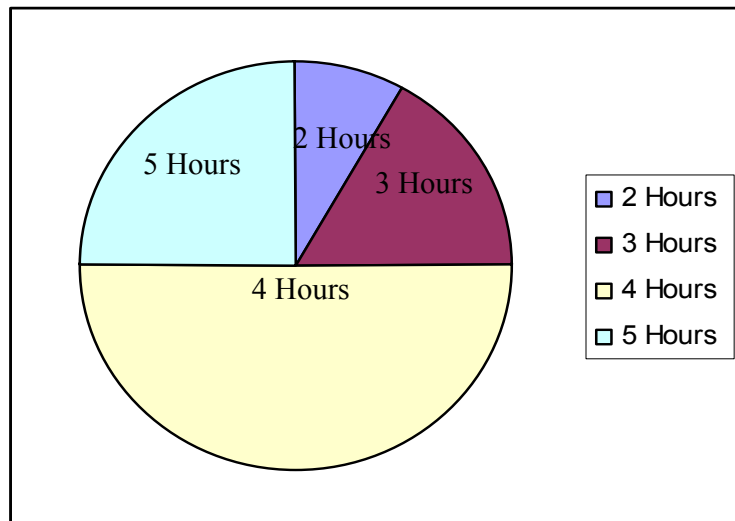
Number of hours	2 hours	3 hours	4 hours	5 hours
Number of people	10	20	60	30
Number of Degrees	<b>30°</b>	60°	<b>180°</b>	<b>90°</b>

$$\frac{10}{120} \times 360 = 30^{\circ}$$

$$\frac{20}{120} \times 360 = 60^{\circ}$$

$$\frac{60}{120} \times 360 = 180^{\circ}$$

$$\frac{30}{120} \times 360 = 90^{\circ}$$



- \*Tolerance  $\pm 5^\circ$
- \*Accept candidate's calculated angles in pie chart.
- \*Mark for 3 segments only.
- \*Allow numbers or degrees as labels.

*Blunders (-3)*

- B1 Correct answer without work. ✘
- B2 Mathematical error in calculating angle (once only).
- B3 Each segment not drawn or incorrectly drawn (max twice).
- B4 No circle, but angles drawn.
- B5 Angles drawn outside tolerance. But be careful with 4<sup>th</sup> segment.
- B6 Excess segment(s).

*Slips (-1)*

- S1 Arithmetic error in calculation.
- S2 Each label omitted or incorrect (maximum -3).

*Attempts (7)*

- A1 Circle drawn.
- A2 Draws bar chart, pictogram etc.
- A3 Writes  $360^\circ$ ,  $90^\circ$  or  $180^\circ$ .
- A4 Any work with  $30^\circ$ ,  $60^\circ$ ,  $90^\circ$ ,  $180^\circ$  or 10, 20, 60, 30, or 2, 3, 4, 5.
- A5 Writes 120 or  $3^\circ$  and stops

*Worthless (0)*

- W1 Incorrect answer, no work shown but see A3,A4 and A5.

**Case:**

If no calculations/values for angles shown and Pie chart with 4 segments drawn:

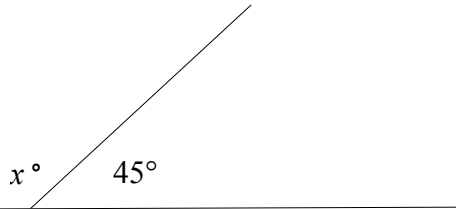
- |  |                         |
|--|-------------------------|
| 4 correct and correctly-labelled segments                  | $1 \times B = 17$ marks |
| 2 or more of segments incorrect but appropriately labelled | $2 \times B = 14$ marks |
| 4 correct segments but all unlabelled or mislabelled       | $2 \times B = 14$ marks |
| No segment correct, but labelled                           | $3 \times B = 11$ marks |
| 2 segments incorrect and unlabelled                        | $3 \times B = 11$ marks |

### QUESTION 3

Part (a)	10 marks	Att 3
Part (b)	20(15, 5) marks	Att(5, 2)
Part (c)	20(10, 10) marks	Att(3, 3)

Part (a) 10 marks Att 3

(a) Find the value of  $x$  in the following diagram.



(a) 10 marks Att 3

(a) ✍

$$x + 45 = 180$$
$$x = 180 - 45$$
$$x = 135^\circ$$

\* No penalty for degree symbol missing

#### Blunders (-3)

- B1 Correct answer without work ✍
- B2 Addition instead of subtraction (with work)
- B3  $360 - 45$  or  $90 - 45$  and continues, to get an answer.

#### Slips (-1)

- S1 Arithmetic error in calculation

#### Misreadings (-1)

- M1 Error in copying down a component/digit

#### Attempts (3)

- A1 Measures angle from diagram.  $135 \pm 5^\circ$  [Excluding 135] or  $45^\circ \pm 5^\circ$
- A2 Any mention of  $180^\circ$ ,  $90^\circ$ ,  $360^\circ$  or  $225^\circ$  without work.

#### Worthless (0)

- W1 Copies diagram and stops.
- W2 Uses  $100^\circ$  as straight line angle.
- W3 Incorrect answer without work but see A1 and A2

Part (b)

20(15, 5) marks

Att(5, 2)

(b) (i) Construct the triangle  $ABC$  with  $|AB| = 8$  cm,  $|\angle BAC| = 70^\circ$  and  $|AC| = 5$  cm.

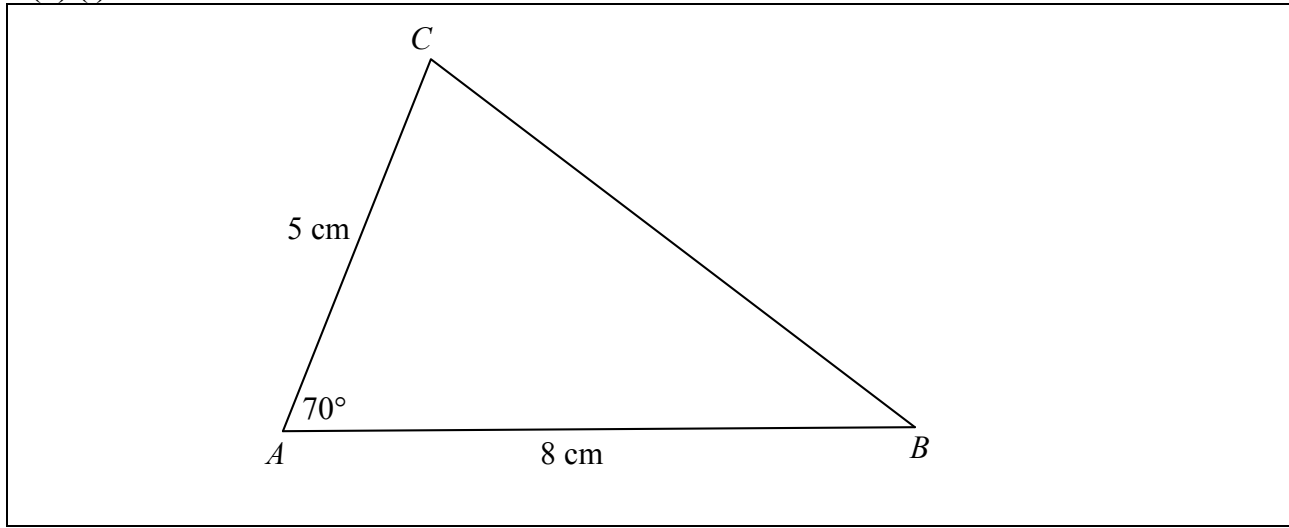
Show all your construction lines.

(ii) Use your ruler to measure the length of the side  $[BC]$

(b) (i)

15 marks

Att 5



\*Accept any orientation.

\*Tolerance  $\pm 0.5$ cm,  $\pm 5^\circ$ .

\*No penalty for not labelling the point C

*Blunders (-3)*

B1 Third line not drawn

*Slips (-1)*

S1 Measurements outside tolerance (each time) but see M1.

S2 Uses inches (once only).

*Misreadings (-1)*

M1  $70^\circ$  at B

*Attempts (5)*

A1 Any reasonable addition to given line.

(b) (ii)

5 marks

Att 2

Length of side  $[BC] = 7.9$  cm

\*Accept answer based on candidate's diagram.

\*Allow candidate's measurement of his/her 3rd side or his/her  $[BC]$ .

\* Tolerance  $\pm 0.5$ cm

\* Accept answer in cm/mm/inches ( 1 inch = 2.54cm).

*Slips (-1)*

S1 Measurement outside of tolerance

Part (c)

20(10, 10) marks

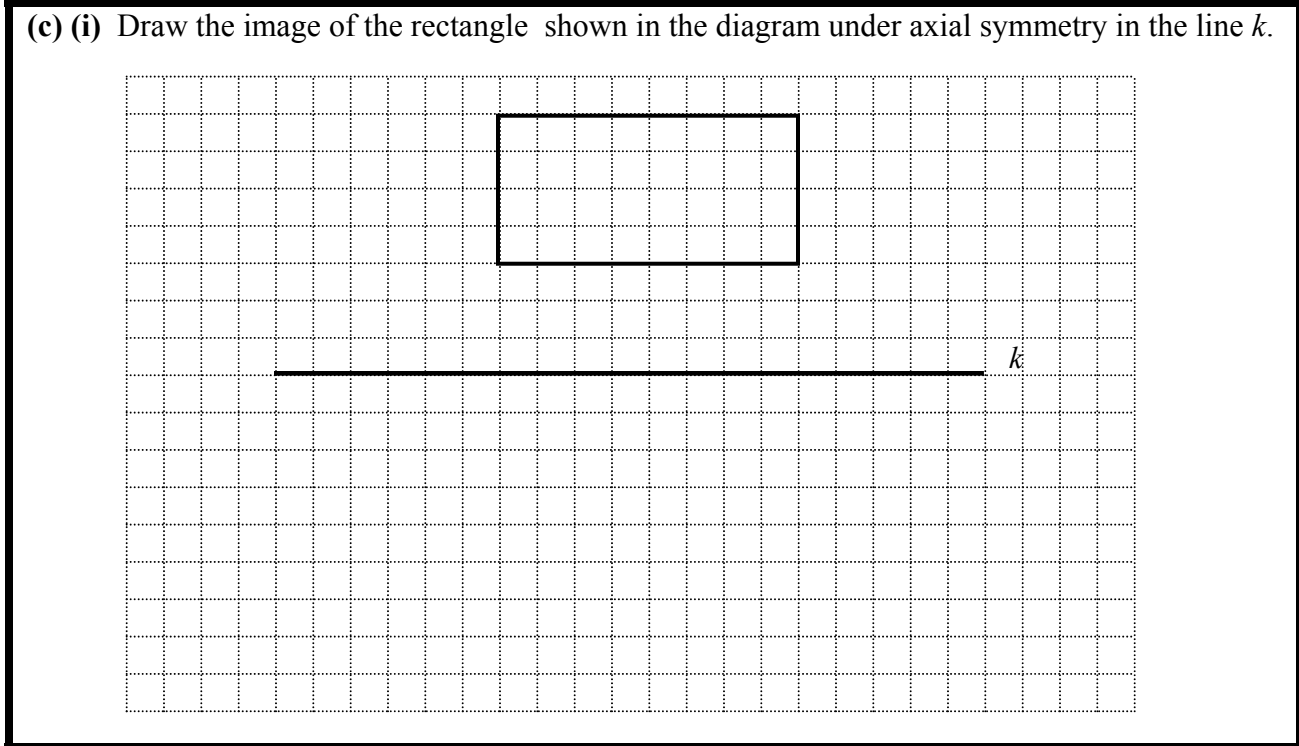
Att(3, 3)

(c) (i)

10 marks

Att 3

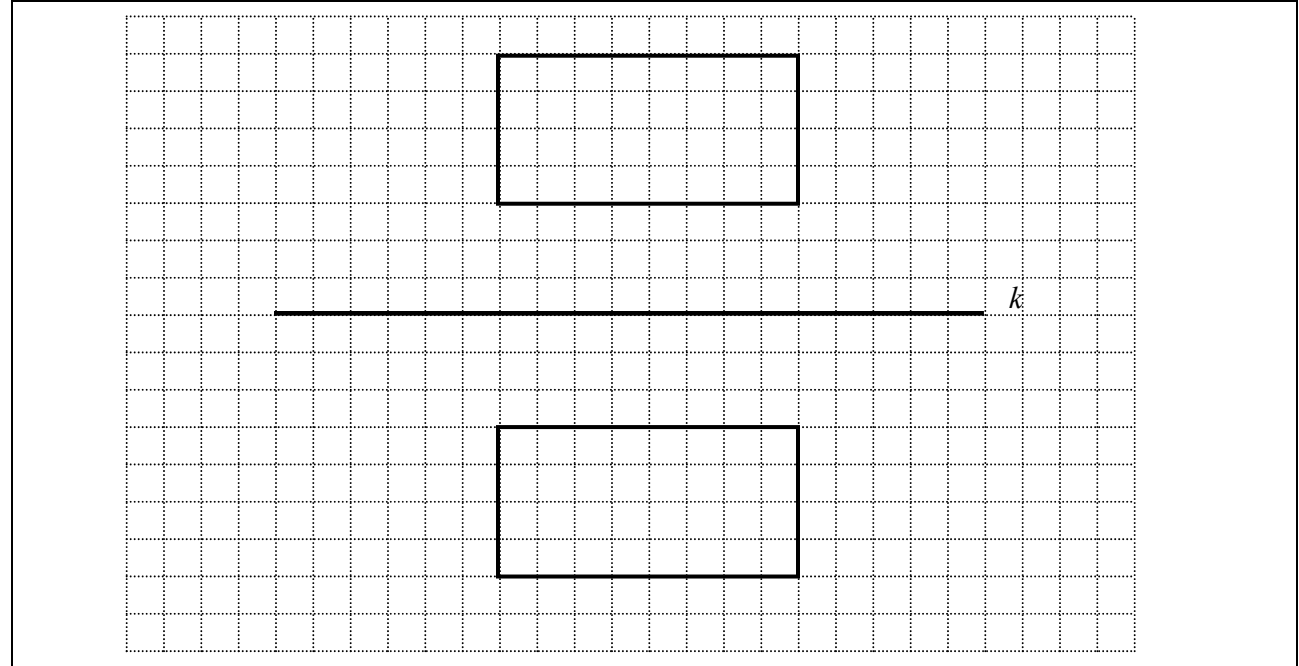
(c) (i) Draw the image of the rectangle shown in the diagram under axial symmetry in the line  $k$ .



(c) (i)

10 marks

Att 3



\*Accept correct answer, without work.

\*Accept tolerance of 1 box ( $\pm 1$  cm)



*Blunders (-3)*

- B1 Vertices located but not joined.
- B2 Incorrect transformation
- B3 Incorrect or omitted vertex (each time).

*Attempts (3)*

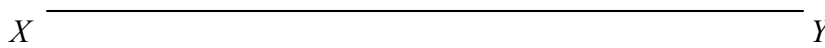
- A1 Copies diagram (onto extra sheet).
- A2 Any rectangle drawn (completely out of scale)
- A3 Any effort at locating an image point.

**(c) (ii)**

**10 marks**

**Att 3**

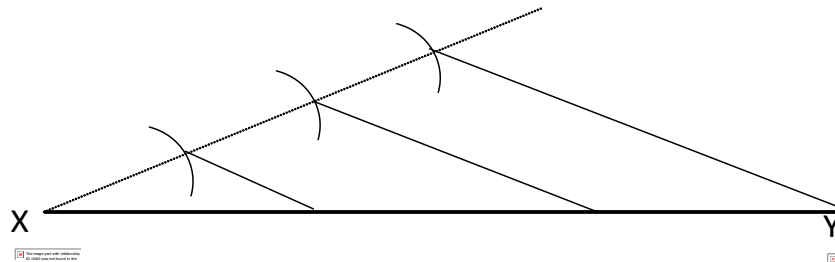
- (ii)** Divide the line segment  $[XY]$  into three equal parts.  
Show all construction lines



**(c) (ii)**

**10 marks**

**Att 3**



\*Accept first construction line at any angle to given line.

\*Accept arc of different radius than shown above.

\*Tolerance  $\pm 0.5\text{cm}$

*Blunders (-3)*

- B1 Unequal subdivisions of construction line (once).
- B2 Third arc not joined to Y.
- B3 Parallel lines omitted.

*Attempts (3)*

- A1 Any relevant step.
- A2 Divides the given line into three equal parts using measurement.

*Worthless (0)*

- W1 Bisects the line segment.

## QUESTION 4

(a)	10 marks	Att 3
(b)	20(10, 10) marks	Att(3, 3)
(c)	20(5, 10, 5) marks	Att(2, 3, 2)

**Part (a)** **10 marks** **Att 3**

(a) Find the value of  $3a + 2b$ , where  $a = 4$  and  $b = 5$ .

(a) **10 marks** **Att 3**

~~✍~~

$$3(4) + 2(5)$$

$$12 + 10$$

$$22$$

### *Blunders (-3)*

- B1 Correct answer without work. ✍
- B2 Mathematical error,  $(3(4) + 2)5 = 70$  or similar.
- B3 Mathematical error e.g.  $3(4) + 2(5) = 34 + 25 = 59$ .
- B4 Not finishing,  $3(4) + 2(5)$  and stops.
- B5 Wrong operator and continues e.g.  $(3 + 4 + 2 + 5 = 14)$

### *Slips (-1)*

- S1 Arithmetic error in calculation. (Max -3).

### *Misreadings (-1)*

- M1 Error in copying down a component.
- M2  $3(5) + 2(4) = 15 + 8 = 23$ .

### *Attempts (3)*

- A1 Any correct step e.g.  $3(4)$  and stops.
- A2 Special cases 12, 10, 14, 23, 59, 70 (with no work shown).

### *Worthless (0)*

- W1 Incorrect answer without work, but see A2 above.

Part (b)

20(10, 10) marks

Att (3, 3)

(b) (i)

10 marks

Att 3

(b) (i) Simplify  $2(x + 4) + 5(x - 2)$ .

(b) (i)

10 marks

Att 3

~~✗~~

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

$$2x + 8 + 5x - 10$$

$$7x - 2$$

*Blunders (-3)*

- B1 Correct answer, without work ~~✗~~
- B2 Distribution error (once).
- B3 Mathematical error e.g.  $2x + 8 = 10x$
- B4 Ignores 2 or 5 and continues.

*Slips (-1)*

- S1 Arithmetic errors in calculation (Max -3).
- S2 Fails to finish (only applies to last line), otherwise blunder ( $7x$  only, or  $-2$  only).
- S3 Sign error

*Misreadings (-1)*

- M1 Error in copying down expression (if task is not over-simplified See B4).

*Attempts (3)*

- A1 Any relevant step e.g.  $2x$  and stops or similar

*Worthless (0)*

- W1 Incorrect answer without work
- W2 Particular case: substitutes a value for  $x$  into expression.

(b) (ii)

10 marks

Att 3

(ii) Solve for  $x$ :  $4x - 2 = 10$

(b) (ii)

10 marks

Att 3

$\sphericalangle$

$$4x - 2 = 10$$

$$4x = 10 + 2$$

$$4x = 12$$

$$x = \frac{12}{4}$$

$$x = 3$$

\* Accept successful trial and error with work. But 3 must appear; Otherwise a blunder.

*Blunders (-3)*

- B1 Correct answer, without work  $\sphericalangle$
- B2 Transposition error each time
- B3 Mathematical error e.g.  $4x - 2 = 2x$
- B4 Ignores 10 and continues. i.e.  $4x = 2$  and  $x = \frac{1}{2}$ .
- B5 Fails to finish e.g.  $4x = 12$ .

*Slips (-1)*

- S1 Arithmetic errors in calculation (Max -3)

*Misreadings (-1)*

- M1 Error in copying down equation if task is not over-simplified

*Attempts (3)*

- A1 Unsuccessful trial and error
- A2 Special case:  $x = 12$  or 12 (with no work)

*Worthless (0)*

- W1 Incorrect answer, no work shown

Part (c)

20(5, 10, 5) marks

Att(2, 3, 2)

(c) (i)

5 marks

Att 2

(c) (i) Given that  $y = 2x + 1$ , complete the table below.

Show all your work.

$x$	1	2	3	4	5
$y$			7		

~~✍~~

**Method I**

$$x=1 \quad y=2(1)+1 \quad y=2+1 \quad y=3 \quad (1,3)$$

$$x=2 \quad y=2(2)+1 \quad y=4+1 \quad y=5 \quad (2,5)$$

$$x=3 \quad y=2(3)+1 \quad y=6+1 \quad y=7 \quad (3,7)$$

$$x=4 \quad y=2(4)+1 \quad y=8+1 \quad y=9 \quad (4,9)$$

$$x=5 \quad y=2(5)+1 \quad y=10+1 \quad y=11 \quad (5,11)$$

**Method II**

$x$	1	2	3	4	5
$2x$	2	4	6	8	10
$+1$	1	1	1	1	1
$y$	3	5	7	9	11

(1,3) (2,5) (3,7) (4,9) (5,11)

\*Answers need not be written in table.

\*Correct answers without work, full marks.

\*If **Graph fully correct**, 5 marks here in (c) (i).

*Blunders (-3)*

B1 Omitted or incorrect entry.

B2 Error e.g.  $y = 2x$ ,  $y = x + 1$ .

*Slips(-1)*

S1 Adds in top line of table (watch for consistency), (4, 7, 10, 13, 16 or 4, 7, 7, 13, 16)

S2 Arithmetic error in calculation. (Max -3)

*Misreadings (-1)*

M1 Error in copying down equation (If task is not over-simplified)

Attempts (2)

A1 Any one correct entry, other than 7, with or without work.

A2  $x = 3$  (only one worked out) correctly i.e.  $y = 7$

A3 5, 6, 7, 8, 9.

Worthless (0)

W1 Table completed with spurious numbers.

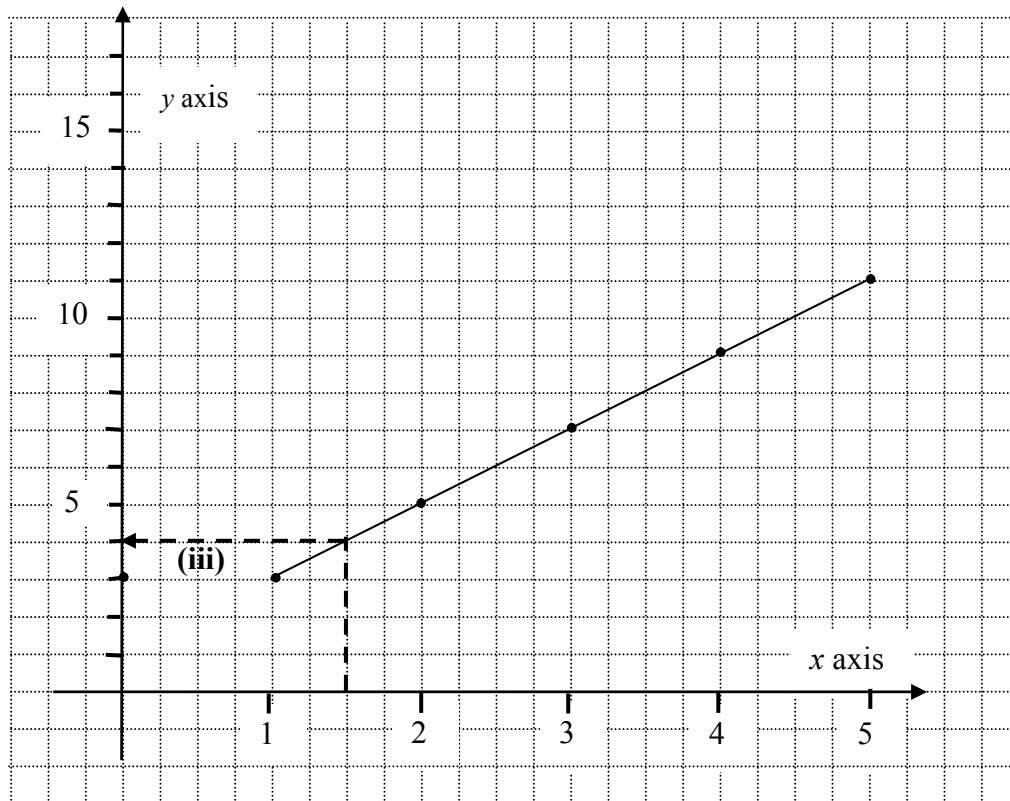
W2 Copies table, with no additional work.

Part (c) (ii)

10 marks

Att 3

(ii) Using your answers from (i), above, draw the graph of  $y = 2x + 1$ , from  $x = 1$ , to  $x = 5$ .



\* Tolerance  $\pm 0.5\text{cm}$  ( $\pm 1$  box on grid).

\* Allow candidate's work from (i).

\* Ignore join to origin.

*Blunders (-3)*

B1 Scale error once.

*Slips (-1)*

S1  $(y, x)$  consistently drawn (penalise once only).

S2 All points not joined.

S3 Each incorrectly plotted point [subject to S1] or omitted end point.

*Attempts (3)*

A1 Random straight line or lines.

A2 One correct point.

**(c) (iii)**

**5 marks**

**Att 2**

**(iii)** Use your graph to find the value of  $y$  when  $x = 1.5$ .

**(c) (iii)**

**5 marks**

**Att 2**

$y = 4$

\* Tolerance  $\pm 0.5\text{cm}$  (one box)

*Slips (-1)*

S1 Indicates the correct answer on graph but does not specify the  $y$  value.

*Misreadings (-1)*

M1 Correct answer got from substituting into equation.

M2 Answer within tolerance, but no indication on graph.

*Attempts (2)*

A1 Any one entry with/without work.


A2 Locates 1.5 on either axis.

A3 Draws any line on graph

## QUESTION 5

<b>Part (a)</b>	<b>10(5, 5) marks</b>	<b>Att(2, 2)</b>
<b>Part (b)</b>	<b>20(10, 10) marks</b>	<b>Att(3, 3)</b>
<b>Part (c)</b>	<b>20(10, 5, 5)</b>	<b>Att(3, 2, 2)</b>

<b>Part (a) (i)</b>	<b>5 marks</b>	<b>Att 2</b>
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 Change 3.75 km to metres.

<b>(a) (i)</b>	<b>5 marks</b>	<b>Att 2</b>
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$$\begin{aligned} 3.75 \text{ km} &= 3.75 \times 1000 \text{ metres} \\ &= 3750 \text{ metres} \end{aligned}$$

\*No penalty for missing units.

\*Case:  $3.75 \times 100 = 375$  : B2

$3.75 \times 1000 = 375$  : S2

### *Blunders (-3)*

B1 Correct answer without work. 

B2 1km not equal to 1000m

B3 Divides by 1000 (work shown).

### *Slips (-1)*

S1 Arithmetic error in calculation (once only)

S2 Decimal error.

S3 Rounds 3.75 to 4 and continues correctly.

### *Misreadings (-1)*

M1 Error in copying down a digit

### *Attempts (2)*

A1 Any mention of 1000

A2 Answer with correct digits but incorrect decimal location, with no work e.g. 375 or 37.5 etc

### *Worthless (0)*

Incorrect answer without work, but see A1, A2.

<b>(a) (ii)</b>	<b>5 marks</b>	<b>Att 2</b>
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 Change 5.2 cm to millimetres.

<b>(a) (ii)</b>	<b>5 marks</b>	<b>Att 2</b>
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$$5.2 \text{ cm} = 5.2 \times 10 \text{ millimetres} = 52 \text{ millimetres}$$

\*No penalty for missing units.

\*Case:  $5.2 \times 100 = 520$  : B2

$5.2 \times 10 = 520$  : S2



*Blunders (-3)*

- B1 Correct answer without work. ✍
- B2 1cm not equal to 10mm
- B3 Divides by 10 (work shown).

*Slips (-1)*

- S1 Arithmetic error in calculation (once only)
- S2 Decimal error.
- S3 Rounds 5.2 to 5 and continues correctly.

*Attempts (2)*

- A1 Any mention of 10
- A2 Answer with correct digits but incorrect decimal location with no work e.g. 520, 0.52 etc.

*Worthless (0)*

- W1 Incorrect answer without work, but see A1, A2.

**Part (b)**

**20(10, 10) marks**

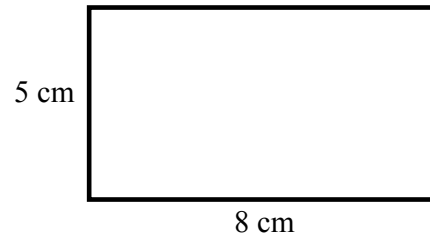
**Att(3, 3)**

**(b) (i)**

**10 marks**

**Att 3**

✍ A rectangle measures 8 cm by 5 cm.  
Find the perimeter of the rectangle.



**Part (b) (i)**

**10 marks**

**Att 3**

$$\begin{aligned} \text{Perimeter} &= 2(\text{length}) + 2(\text{width}) \\ &= 2(8) + 2(5) \\ &= 16 + 10 \\ &= 26 \text{ cm} \end{aligned}$$

$$\begin{aligned} \text{Perimeter} &= 2(\text{length} + \text{width}) \\ &= 2(8 + 5) \\ &= 2(13) \\ &= 26 \text{ cm} \end{aligned}$$

\*No penalties for omission of units.

*Blunders (-3)*

- B1 Correct answer without work. ✍
- B2 Calculates area  $8 \times 5 = 40$
- B3  $8 \times 8 \times 5 \times 5 = 1600$  or  $8 \times 8 + 5 \times 5 = 89$
- B4 Fails to finish.

*Slips (-1)*

- S1 Numerical error.
- S2 Each side omitted / each additional side included in the addition.

*Attempts (3)*

A1 10, 13, 16, 18, 21, 40, 89 or 1600 without work.

A2 Tries to find diagonal

A3 Labels one or both unlabelled sides.

A4 Indicates perimeter.


*Worthless (0)*

W1 Incorrect answer without work, but see A1.

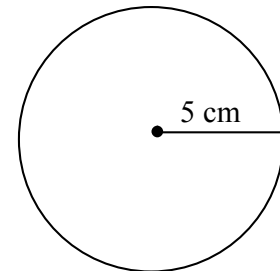
**(b) (ii)**

**10 marks**

**Att 3**

 The radius of a circle is 5 cm.

Calculate the perimeter of the circle. Use  $\pi = 3.142$ .



**(b) (ii)**

**10 marks**

**Att 3**



$$\begin{aligned}\text{Perimeter of a circle} &= 2\pi r \\ &= 2 \times 3.142 \times 5 \\ &= 6.284 \times 5 \\ &= 31.42 \text{ cm}\end{aligned}$$

\*No penalty for using  $\pi$  from calculator, (with work).

*Blunders (-3)*

B1 Correct answer without work. 

B2 Each incorrect or omitted substitution

B3 Mathematical error or incorrect substitution

B4 Value of  $\pi$  not used in calculation i.e  $2 \times 5 = 10$ .

B5 Calculates area.

*Slips (-1)*

S1 Arithmetic error in calculation (max -3).

S2 Decimal error.

S3 Gives answer as  $10\pi$

*Misreadings (-1)*

M1 Error in copying down a digit

*Attempts (3)*

A1 Writes  $2\pi r$  or  $\pi r^2$  and stops.

A2 Special cases: 10, 6.284, 44/7, 15.71 without work.

*Worthless (0)*

W1 Incorrect answer without work but see A1 and A2.

W2 Incorrect formula without  $\pi$  and stops.

**Part (c)**

**20(10, 5, 5) marks**

**Att(3, 2, 2)**

**(c) (i)**

**10 marks**

**Att 3**

 A rectangular block of wood is 10 cm long, 4 cm wide and 4 cm high.

Find the volume of the block in  $\text{cm}^3$ .



**(c) (i)**


**10 marks**

**Att 3**

$$\begin{aligned}\text{Volume of block} &= \text{length} \times \text{width} \times \text{height} \\ &= 10 \times 4 \times 4 \\ &= 40 \times 4 \\ &= 160 \text{ cm}^3\end{aligned}$$

\*No penalty for missing units.

*Blunders (-3)*

B1 Correct answer without work. 

B2 Each incorrect or omitted substitution

B3 Incorrect relevant formula, but see S3.

B4 Calculates the area of any side and stops

B5 Surface Area incomplete

*Slips (-1)*

S1 Arithmetic error in calculation (max -3)

S2 Decimal error.

S3 Calculates surface area correctly (192)

*Misreadings (-1)*

M1 Error in copying down a digit

*Attempts (3)*

- A1 Mentions Volume = length x breadth x height and stops
- A2 Correct substitution into incorrect volume formula with  $\pi$
- A3  $10 + 4 + 4 = 18$  or 18 without work.
- A4 A multiple of 10 or 4 without work.


*Worthless (0)*

- W1 Incorrect answer without work but see A3 and A4.
- W2 Incorrect formula with  $\pi$ , but see A2

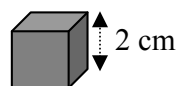
**(c) (ii)**


**5 marks**

**Att 2**


 The length of a side of a solid wooden cube is 2 cm.

Find the volume of the cube in  $\text{cm}^3$ .



 Volume of cube =  $l^3$   
 $= 2^3$   
 $= 8 \text{ cm}^3$

*Blunders (-3)*

- B1 Correct answer without work 
- B2 Incorrect relevant formula
- B3 Incorrect substitution

*Slips (-1)*

- S1 Numerical slip to a maximum of (-3)
- S2 Calculates the surface area correctly (24).

*Attempts (3 marks)*

- A1 Correct formula and stops.
- A2 Some correct step and stops.
- A3  $2 + 2 + 2 = 6$
- A4 Some multiplication
- A5 A multiple of 2 other than 8, without work.
- A6 24 without work.

*Worthless (0)*

- W1 Incorrect answer without work, but see A5 and A6.

(c) (iii)

5 marks

Att 2

✍ How many of these wooden cubes can be made from the block of wood in part (i)?

(c) (iii)

5 marks

Att 2

$$\begin{aligned}\text{Number of wooden cubes} &= \frac{\text{Volume of block}}{\text{Volume of cube}} \\ &= \frac{160}{8} = 20 \text{ wooden cubes}\end{aligned}$$

\*Accept candidate's answers from (i) and (ii)

*Blunders (-3)*

B1 Correct answer without work. ✍

B2 Incorrect operator, with work.

*Slips (-1)*

S1 Arithmetic error in calculation (max -3)

S2 Decimal error.

*Misreadings (-1)*

M1 Error in copying down a digit/ component.

*Attempts (2)*

A1 Some work with answers from (i) and (ii)

*Worthless (0)*

W1 Incorrect answer without work, but see \* above.

## QUESTION 6

Part (a)	10 marks	Att 3
Part (b)	20(10, 10)	Att(3, 3)
Part (c)	20(10, 5, 5)	Att(3, 2, 2)

Part (a) 10 marks Att 3

(a) Complete the following, putting the correct number in each box below:

$$\frac{1}{2} = \frac{\boxed{\phantom{000}}}{6}$$

$$\frac{1}{3} = \frac{\boxed{\phantom{000}}}{6}$$

$$\frac{1}{2} + \frac{1}{3} = \frac{\boxed{\phantom{000}}}{6}$$

(a) 10 marks Att 3

$$\frac{1}{2} = \frac{\boxed{3}}{6}$$

$$\frac{1}{3} = \frac{\boxed{2}}{6}$$

$$\frac{1}{2} + \frac{1}{3} = \frac{\boxed{5}}{6}$$

\* Accept correct answers without work.

*Blunders (-3)*

B1 Box 1 incorrect.

B2 Box 2 incorrect.

B3 Box 3 not equal to the sum of Boxes (1) and (2) or not equal to 5.

*Attempts (3)*

A1 Some relevant work

Part (b)

20(10, 10) marks

Att(3, 3)

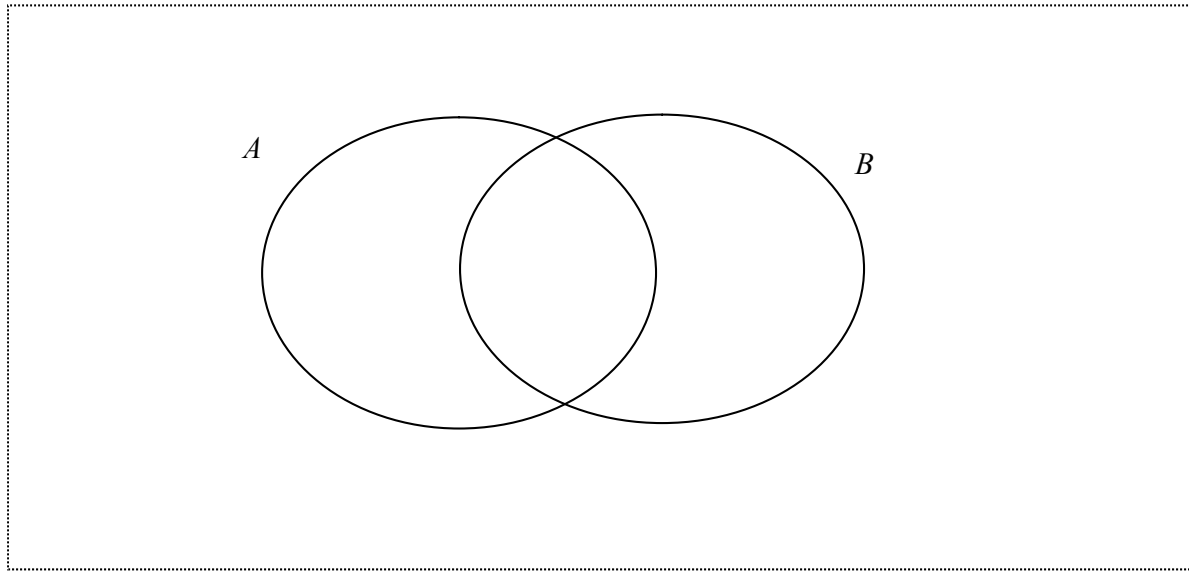
(b) (i)

10 marks

Att 3

(b)  $A = \{1, 5, 7, 9\}$  and  $B = \{7, 9, 11\}$

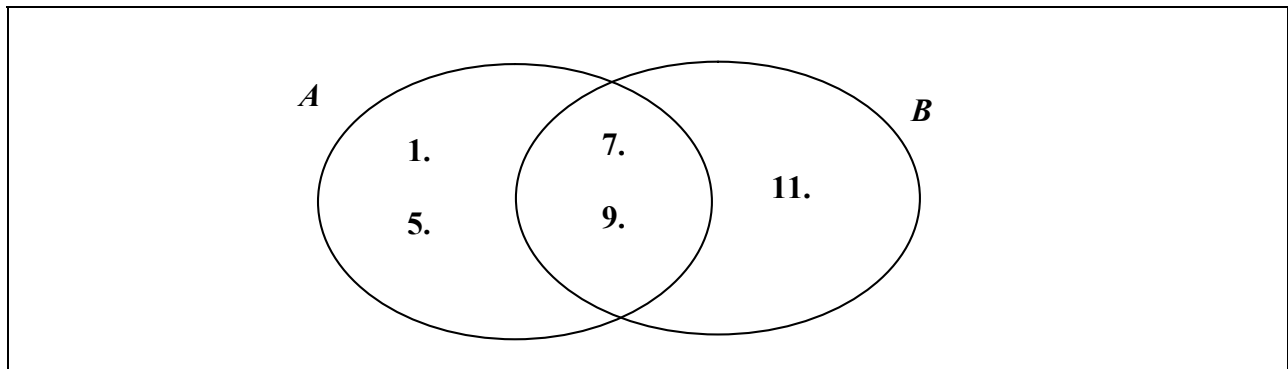
(i) Show the elements of the sets  $A$  and  $B$  on the Venn diagram below.



(b) (i)

10 marks

Att 3



*Slips (-1)*

S1 Each incorrect or omitted entry

*Attempts (3)*

A1 Some incorrect use of an element of  $A$  or  $B$

*Worthless (0)*

W1 No element of  $A$  or  $B$

(b) (ii)

10 marks

Att 3

(ii) List the elements of  $A \cap B$ .

(b) (ii)

10 marks

Att 3

$$A \cap B = \{ 7, 9 \}$$

\*Accept appropriate shading

\*Accept candidate's incorrect  $A \cap B$  from Venn diagram in (b) (i).

*Blunders (-3)*

B1 Shades or lists Union

*Slips (-1)*

S1 Each additional, omitted or incorrect element.

*Attempts (3 marks)*

A1 Mentions 'together' or similar

*Worthless (0)*

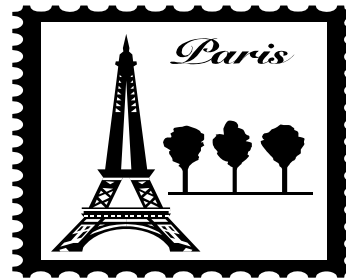
W1 No element of A or B

**Part (c)**

**20(10, 5, 5) marks**

**Att(3, 2, 2)**

(c) Sarah works as a tour guide in Paris.  
Her gross pay is €400 per week.



(c) (i)

10 marks

Att 3



Tax is paid at 20%. What is the total tax due each week on Sarah's gross pay?

(c) (i)

10 marks

Att 3

Gross = €400

$$20\% = \frac{1}{5}$$

Tax @ 20% =  $400 \times 20\% = €80$

$$\frac{1}{5} \text{ of } €400 = €80$$

\*Accept other valid methods.



*Blunders (-3)*

- B1 Correct answer without work. ✗
- B2 Inverts once only e.g.  $\frac{100}{20} \times 400$
- B3 20% not equal to 0.2 or 1/5
- B4 Fails to finish
- B5 No use of 100
- B6 Calculates 80% or 120% and stops.

*Slips (-1)*

- S1 Arithmetic error in calculation (max -3)
- S2 Decimal error.

*Misreadings (-1)*

- M1 Error in copying down a digit

*Attempts (3)*

- A1 Any relevant step or mentions 100 and stops
  - A2 Any mention of 0.2 or 1/5
- \*Special case: 320 without work (4 marks).

*Worthless (0)*

- W1  $400 \pm 20$

**(c) (ii)**

**5 marks**

**Att 2**



Sarah has tax credits of €50 per week.

Find how much tax she pays each week.

**(c) (ii)**

**5 marks**

**Att 2**

$$\begin{aligned} \text{Tax Paid} &= \text{Gross Tax} - \text{Tax Credits} \\ &= € 80 - € 50 \\ &= € 30 \end{aligned}$$

\*Accept candidate's answer from (i)

*Blunders (-3)*

- B1 Correct answer without work. ✗
- B2 Addition instead of subtraction.

*Slips (-1)*

- S1 Arithmetic error in calculation (maximum -3)
- S2 Decimal error.

*Misreadings (-1)*

- M1 Error in copying down a digit


*Attempts (2)*

- A1 Some work with answer from (i) in this section

(c) (iii)

5 marks

Att 2

(iii)  Use your answer from part (ii) to calculate Sarah's take home pay.

(c) (iii)

5 marks

Att 2

$$\begin{aligned}\text{Take home Pay} &= \text{Gross Pay} - \text{Tax Paid} \\ &= €400 - €30 \\ &= €370\end{aligned}$$

\*Accept candidate's answer from c(ii)

*Blunders (-3)*

B1 Correct answer without work (~~✗~~)

B2 Addition instead of subtraction.

*Slips (-1)*

S1 Arithmetic error in calculation (maximum -3)

S2 Decimal error.

*Misreadings (-1)*

M1 Error in copying down a digit

*Attempts (2 marks)*

A1 Some work with answer from (ii) in this section

## **BONUS MARKS FOR ANSWERING THROUGH IRISH**

Bonus marks are applied separately to each paper as follows:

If the mark achieved is 225 or less, the bonus is 5% of the mark obtained, rounded *down*.  
(e.g.  $198 \text{ marks} \times 5\% = 9.9 \Rightarrow \text{bonus} = 9 \text{ marks.}$ )

If the mark awarded is above 225, the following table applies:

Bunmharc (Marks obtained)	Marc Bónais (Bonus Mark)	Bunmharc (Marks obtained)	Marc Bónais (Bonus Mark)
226	11	261 – 266	5
227 – 233	10	267 – 273	4
234 – 240	9	274 – 280	3
241 – 246	8	281 – 286	2
247 – 253	7	287 – 293	1
254 – 260	6	294 – 300	0