



Coimisiún na Scrúduithe Stáit
State Examinations Commission

JUNIOR CERTIFICATE EXAMINATION

2012

MARKING SCHEME

**MATHEMATICS
FOUNDATION LEVEL**

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 as B1, B2, B3,....., S1, S2, S3,....., M1, M2, etc. Note that these lists are not exhaustive.

2. When awarding attempt marks, e.g. Att (3), it is essential to 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 *same* error in the *same* section of a question is penalised *once* only.

5. 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.

6. Particular cases, verifications and answers derived from diagrams (unless requested) qualify for attempt marks only.

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

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

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

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

QUESTION 1

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

Find the value of:

(i) $52 + 84 =$

(ii) $78 - 35 =$

(a) (i)	5 marks	Att 2
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(i)	136
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* No penalty for work not shown: no ✍

Blunders (-3)

B1 Uses incorrect operator (with work)

Slips (-1)

S1 Numerical errors (once only)

Misreadings (-1)

M1 Error in copying down a digit (once only)

Attempts (2 marks)

A1 Special cases: $-32 (-)$, $4368 (\times)$, $13/21$ or $0.619 (\div)$ without work

Worthless (0)

W1 Incorrect answer without work but check A1

(a) (ii)	5 marks	Att 2
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(ii)	43
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*No penalty for work not shown: no ✍

Blunders (-3)

B1 Uses incorrect operator (with work)

Slips (-1)

S1 Numerical errors (once only)

Misreadings (-1)

M1 Error in copying down a digit (once only)

Attempts (2 marks)

A1 Special cases: $113(+)$, $2730(\times)$, $78/35$ or $2.228(\div)$ without work

Worthless (0)

W1 Incorrect answer without work but check A1

Part (b)

20 (5,5,5,5)

Att (2,2,2,2)

Find the value of:

(i) $407 \div 11 =$

(ii) $16 \cdot 8 - 7 \times 2 =$

(iii) $\sqrt{36} =$

(iv) $2^3 =$

(b) (i)

5 marks

Att 2

(i) 37

*No penalty for work not shown: no $\cancel{\text{e}}$

Blunders (-3)

B1 Uses incorrect operator (with work)

Slips (-1)

S1 Arithmetic error in calculation (once only)

S2 Decimal error

Misreadings (-1)

M1 Error in copying down a digit (once only)

Attempts (2 marks)

A1 Any attempt at division. [Evidence of operation – only one correct digit written down]

A2 Special cases: 418(+), 4477(\times), $1/37$ or 0.027 (\div reversed), 396(-)

Worthless (0)

W1 Incorrect answer without work, but check A2 above.

(b) (ii)

5 marks

Att 2

$$\begin{aligned} & 16.8 - 7 \times 2 \\ & = 16.8 - 14 \\ & = 2.8 \end{aligned}$$

*No penalty for work not shown: no \sphericalangle

Blunders (-3)

- B1 Uses incorrect operator (with work)
- B2 Incorrect order $(16.8 - 7) \times 2 = 19.6$
- B3 Fails to finish. Answer left as $16.8 - 14$

Slips (-1)

- S1 Arithmetic error in calculation each time to a maximum of -3
- S2 Decimal error each time to a maximum of -3
- S3 Final answer left as an improper fraction (e.g. $14/5$)

Misreadings (-1)

- M1 Error in copying down a digit (once only)

Attempts (2 marks)

- A1 Any attempt at multiplication/subtraction
- A2 9.8 or 14 or 19.6 or 33.6 without work

Worthless (0)

- W1 Incorrect answer without work but check A2

(b) (iii)

5 marks

Att 2

(iii)

6

*No penalty for work not shown: no \sphericalangle

Blunders (-3)

- B1 $36^2 = 1296$
- B2 $36 \times 2 = 72$
- B3 $36 \times 1/2 = 18$
- B4 $\sqrt[3]{36} = 3.3$

Slips (-1)

- S1 Arithmetic error in calculation

Misreadings (-1)

- M1 Error in copying down a digit (once only)

Attempts (2 marks)

- A1 $36^{1/2}$ and stops
- A2 Special cases : 3.3, 18, 72, 1296 without work

Worthless (0)

- W1 Incorrect answer without work, but see A2

(b) (iv)

5 marks

Att 2

(iv)

8

*No penalty for work not shown: no ✍

Blunders (-3)

B1 $2 \times 3 = 6$

B2 $3 \div 2 = 1.5$

B3 $3^2 = 9$

B4 $2 \div 3 = 2/3$ or 0.666

B5 $21/3 = 1.2599$

B6 $\sqrt{3} = 1.73$

Slips (-1)

S1 Arithmetic error in calculation (once only)

S2 Decimal error

S3 $2 \times 2 \times 2$ and stops

Misreadings (-1)

M1 Error in copying down a digit (once only)

Attempts (2 marks)

A1 2×3 and stops

A2 Special cases: $\frac{2}{3}$ or 0.666, 1.2599, 1.5, 1.73, 6, 9 without work.

Worthless (0)

W1 Incorrect answer without work, but check A2

Part (c) (i)

10 marks

Att 3

A circus ticket costs €16 for an adult and €8.50 for a child.
Find the total cost for 2 adults and 3 children.

(c)(i)

10 marks

Att 3

2 Adults @ €16 each	= €32
3 Children @ €8.50 each	= €25.50
Total	= €57.50

Blunders (-3)

- B1 Correct answer without work (✍)
- B2 Ignores multiples of items shown (once only). Answer given as 24.50
- B3 Fails to add subtotals
- B4 Subtracts subtotals

Slips (-1)

- S1 Arithmetic error in calculation each time to a maximum of -3
- S2 Decimal error each time to a maximum of -3
- S3 Final total left as an improper fraction or mixed number

Misreadings (-1)

- M1 Error in copying down a digit (once only)
- M2 $3 \times 16 + 2 \times 8.50 = 65$

Attempts (3 marks)

- A1 Any attempt at multiplication/division
- A2 17 or 24.50 or 25.50 or 32 or 48 or 65 without work

Worthless (0)

- W1 Incorrect answer without work but check A2

(c)(ii)

10 marks

Att 3

The tickets are paid for with a €50 note and a €20 note.
How much change should be given back?

(c)(ii)

10 marks

Att 3

Total handed in for payment: $€50 + €20 = €70$

Total Cost: €57.50

Change = $€70 - €57.50$
= €12.50

* Accept candidate's answer from (c) (i)

* Accept answer in cents

Blunders (-3)

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

B2 Adds instead of subtracts

B3 Order of subtraction reversed but accept $57.50 - 70 = 12.50$

Slips (-1)

S1 Arithmetic error in calculation (once only)

S2 Final answer left as an improper fraction or mixed number

S3 Decimal error

Misreadings (-1)

M1 Error in copying down a digit (once only)

Attempts (3 marks)

A1 57.50 or 70 or 127.50 without work

Worthless (0)

W1 Incorrect answer without work but check A1

QUESTION 2

Part (a)	10(5,5) marks	Att (2,2)
Part (b)	20(5,10,5) marks	Att (2,3,2)
Part (c)	20 marks	Att 7

(a)(i) **5 marks** **Att 2**

Write down the mode of the following numbers:

6, 1, 4, 0, 3, 4

(a)(i) **5 marks** **Att 2**

Mode = 4

*Accept correct answer without work: no \surd

Blunders (-3)

B1 Correct frequency table constructed and stops.

Slips (-1)

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

Attempts (2 marks)

A1 "two" written or 2 or "most common number."

A2 Tries to find mean, with work.

A3 Numbers rearranged in ascending/descending order.

A4 3 given as answer (mean) with/without work

Misreadings (-1)

M1 Error in copying down a digit

Worthless (0)

W1 Incorrect answer without work, but see A1 and A4

(a)(ii)

5 marks

Att 2

Find the mean of the following numbers:

6, 1, 4, 0, 3, 4

(a)(ii)

5 marks

Att 2

$$\text{Mean} = \frac{6+1+4+0+3+4}{6} = \frac{18}{6} = 3$$

*Accept correct mode for this part if correct mean is worked out in (a) (i)

Blunders (-3)

- B1 Correct answer without work ($\cancel{}$)
- B2 Omits 6 or multiplies by 6 ($18 \times 6 = 108$)
- B3 Addition not complete

Slips (-1)

- S1 Arithmetic error in calculation
- S2 Each incorrect, omitted or additional numbers to maximum -3
- S3 Count of numbers not equal to 6
- S4 Fails to finish (Answer left as $18/6$)

Misreadings (-1)

- M1 Error in copying down a digit

Attempts (2marks)

- A1 Finds median $(3+4)/2=3.5$
- A2 Numbers arranged in ascending or descending order
- A3 4 written without work but see *
- A4 Mention of 6 or 18 or 108 without work

Worthless(0)

- W1 Incorrect answer without work but check A3, A4

Part (b)

20(5,10,5) marks

Att (2,3,2)

The following table shows the number of different types of animal on a farm:

Type of Animal	Cow	Sheep	Pig	Horse	Goat
Number	12	14	10	8	6

(b)(i)

5 marks

Att 2

Calculate the total number of animals on the farm.

(b)(i)

5 marks

Att 2

Total number of animals = $12+14+10+8+6=50$

*Ignore excess work.

Blunders (-3)

B1 Correct answer without work ($\not\approx$)

B2 No total

Slips (-1)

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

S2 Arithmetic error in calculation

Misreadings (-1)

M1 Error in copying down digit

Attempts (3marks)

A1 Two numbers only added

Worthless (0)

W1 Incorrect answer without work

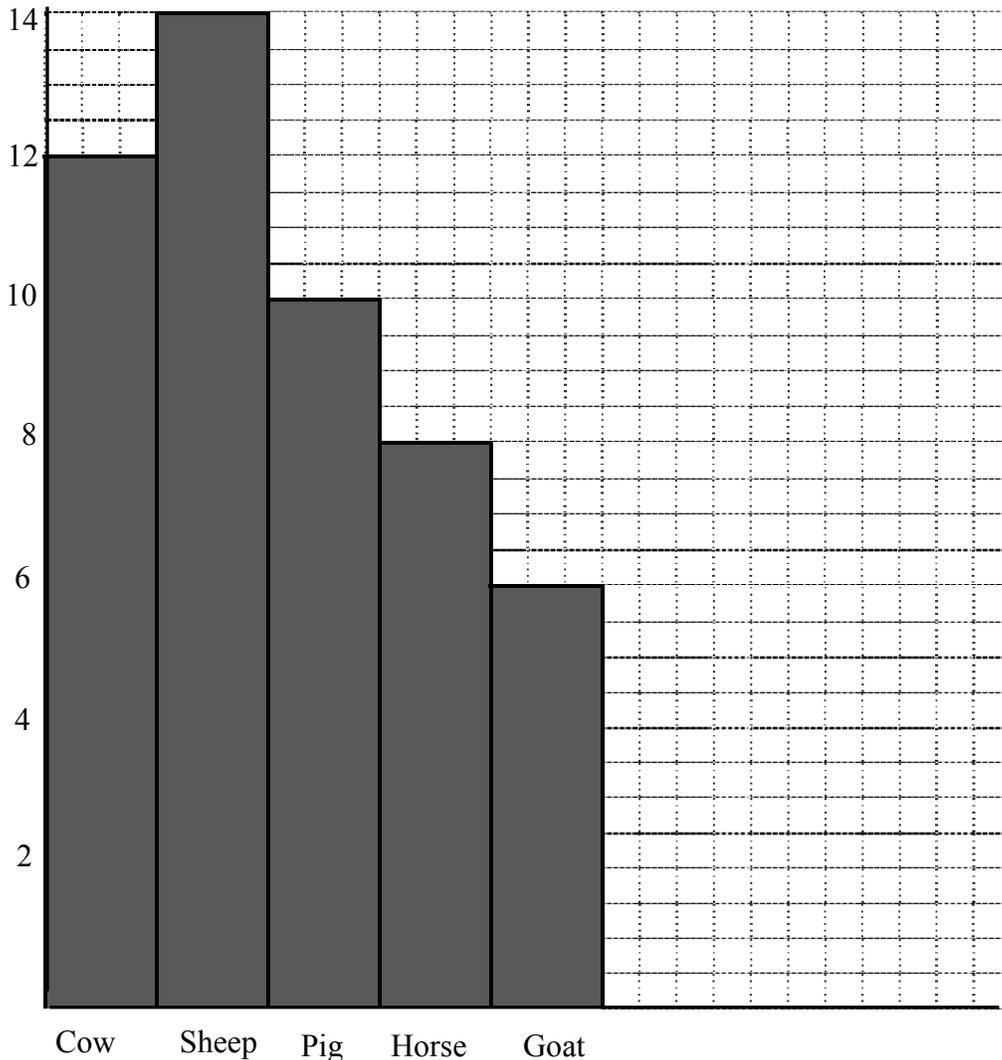
W2 Selects at most one of 12,14,10,8,6

(b)(ii)

10 marks

Att 3

Draw a bar chart to represent the number of each type of animal on the farm.
Use the grid below to draw your bar chart.



- * Accept correct graph with no labels if given order is unchanged
- * 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 number of animals not graduated uniformly
- B2 Draws a trend graph or pie chart
- B3 Each bar omitted

Slips (-1)

- S1 Each incorrect bar outside of tolerance. Tolerance: $\pm \frac{1}{2}$ cm, ± 1 box (to maximum -3)
- S2 Unlabelled diagram with given order changed.

Attempts (3marks)

- A1 Draws one or both axes and stops.

(b) (iii)

5 marks

Att 2

Express the number of sheep as a percentage of the total number of animals on the farm.

(b) (iii)

5 marks

Att 2

$$\text{Sheep} = \frac{14}{50} \times 100 = 28\%$$

* Accept candidates answer from (b) (i)

Blunders (-3)

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

B2 Inverted fraction

B3 No mention of 100

B4 Incorrect numerator or denominator (each time), but see B2

B5 Fails to finish

Slips (-1)

S1 Arithmetic error in calculation

S2 Decimal error

Misreadings (-1)

M1 Error in copying down a digit

Attempts (2marks)

A1 Any relevant step (e.g. mentions 100 and stops)

Worthless (0)

W1 Incorrect answer without work

Part (c)

20 marks

Att 7

60 students were asked to name the colour of their mobile phone.

The table shows the results.

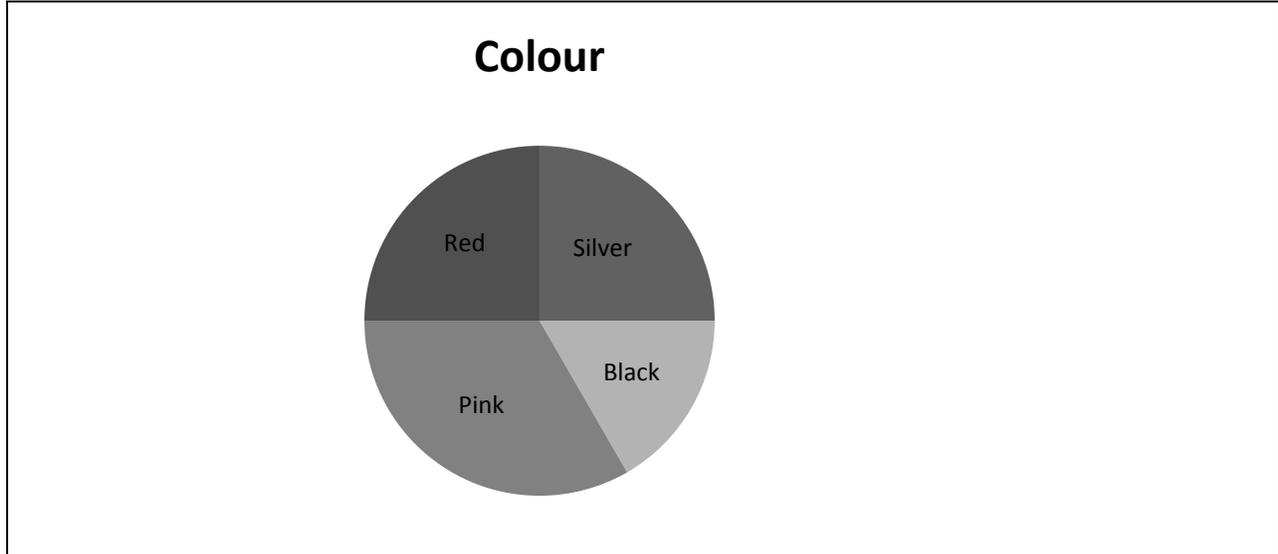
Colour	Red	Black	Pink	Silver
Number of Students	15	10	20	15

We wish to show this information on a pie chart.

Complete the table:

Colour	Red	Black	Pink	Silver
Number of Students	15	10	20	15
Number of Degrees	90°	60°	120°	90°

Draw the pie chart.



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

Blunders (-3)

- B1 Blunders in calculating the angles (once only).
- B2 Errors in drawing the three sectors (each time to a maximum of three blunders)

Slips (-1)

- S1 Arithmetic errors in calculating the angles to maximum -3
- S2 Each label omitted or incorrect to maximum -3

Attempts (7 marks)

- A1 Circle drawn
- A2 Draws bar chart, trend graph etc.
- A3 Mention of 360° , 90° or 180°
- A4 Any work with 90° , 60° , 120° or 15, 10, 20, 15
- A5 Writes 60 or 6° and stops

Worthless (0)

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

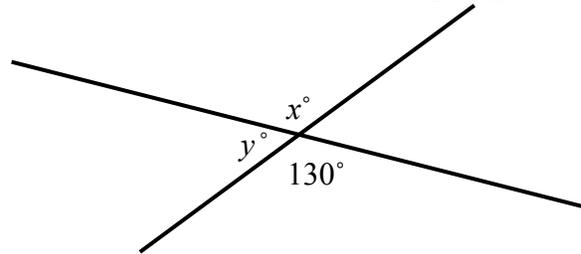
Case: If no calculations/values for angles are shown and Pie chart is drawn:
Accept sectors within tolerance and correctly labelled, for full marks.
If sector(s) are outside tolerance apply B1 as well as B2 and/or S2.

QUESTION 3

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

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

Find the value of x and the value of y in the following diagram.



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

$$x = 130$$

$$y = 180 - 130 = 50$$

* Incorrect values for x and y with work but $x + y = 180$ merits 7 marks

Blunders (-3)

- B1 Correct answer for y without work (\sphericalangle)
- B2 Addition instead of subtraction (with work)
- B3 $360 - 130$ and continues to get an answer.

Slips (-1)

- S1 Arithmetic error in calculation

Misreadings (-1)

- M1 Error in copying down a component or digit

Attempts (2 marks)

- A1 Measures angle from diagram. $50 \pm 5^\circ$ or $130 \pm 5^\circ$ [Excluding 50 or 130]
- A2 Any mention of 180° , 90° or 360° .

Worthless (0)

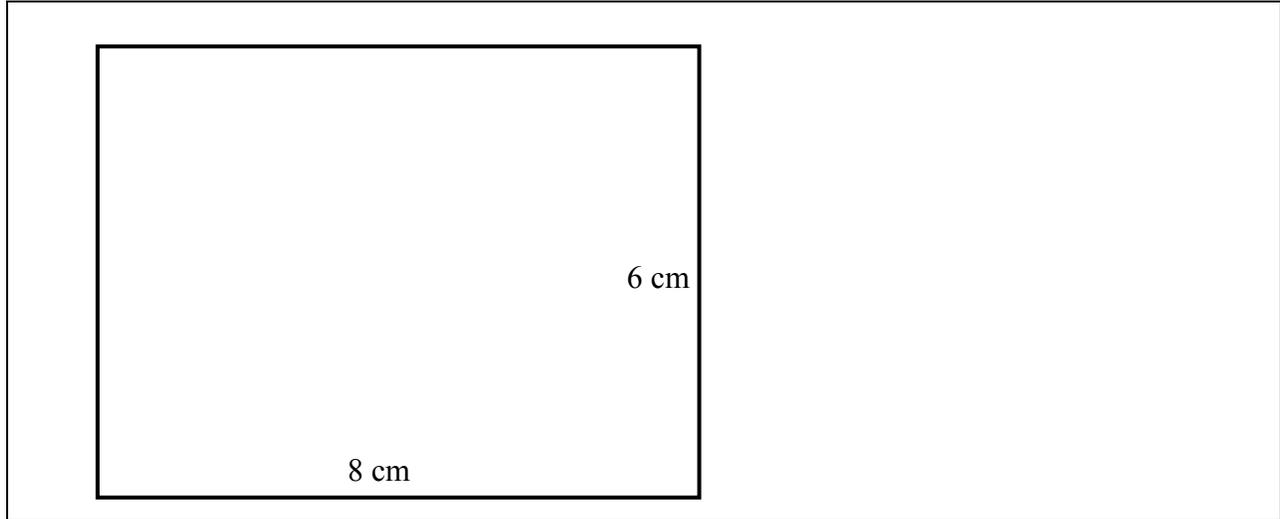
- W1 Copies diagram and stops.
- W2 Uses 100° as straight line angle.

(b) (i)

15 marks

Att 5

Construct a rectangle 8 cm long and 6 cm wide.



Blunders (-3)

B1 Each side omitted

Slips (-1)

S1 Each side outside tolerance to maximum -3. (Tolerance $\pm 0.5\text{cm}$)

S2 Each angle outside tolerance to maximum -3. (Tolerance $\pm 5^\circ$)

Attempts (5 marks)

A1 Pilot diagram (free hand)

(b) (ii)

5 marks

Att 2

Measure, in centimetres, the length of a diagonal of the rectangle you have drawn.

(b) (ii)

5 marks

Att 2

The length of the diagonal is: 10 cm

*Accept answer based on candidate's diagram.

*Allow candidate's measurement of his/her diagonal.

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

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

Slips (-1)

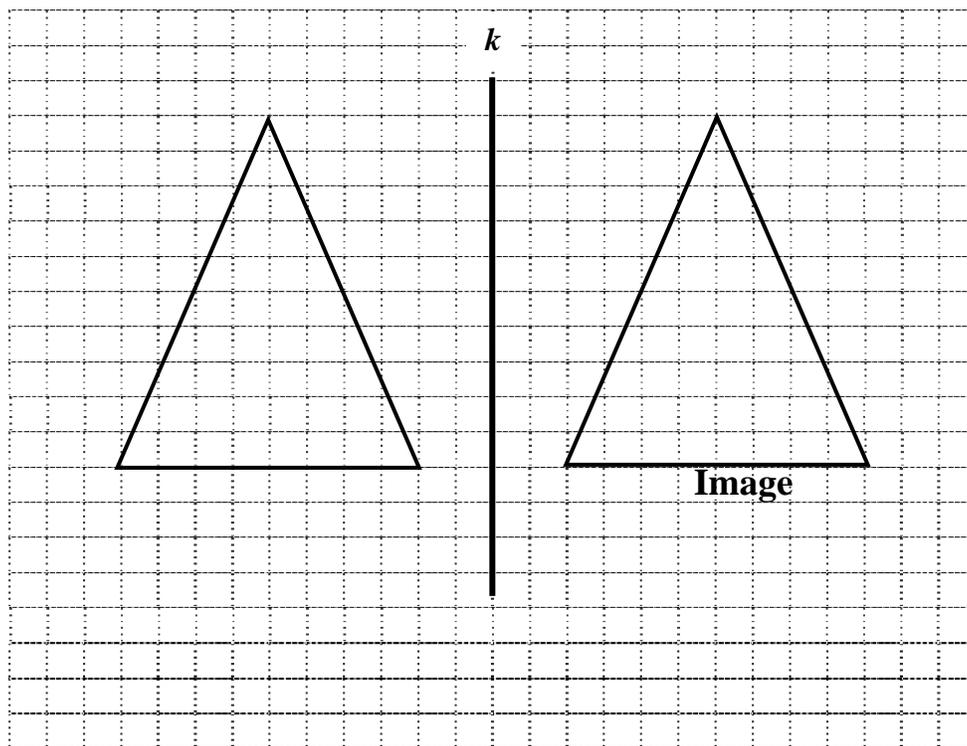
S1 Measurement outside tolerance

(c)(i)

10 marks

Att 3

Draw the image of the triangle in the diagram under the axial symmetry in the line k .



- * Accept correct answer, without work.
- * Accept tolerance of one box ($\pm 0.5\text{cm}$)

Blunders (-3)

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

Attempts (3 marks)

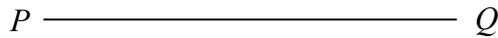
- A1 Copies diagram (onto extra sheet).
- A2 Any triangle drawn (completely out of scale)
- A3 Any effort at locating an image point.

(c)(ii)

10 marks

Att 3

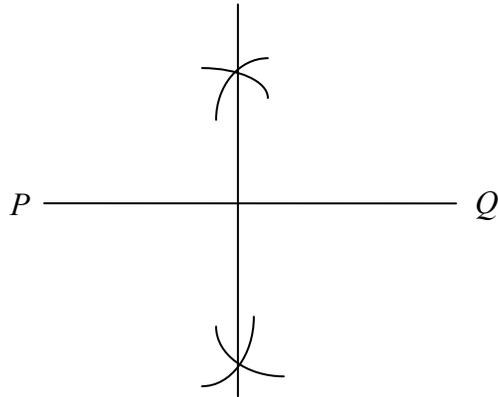
Divide the line segment $[PQ]$ into two equal parts.
Show all construction lines.



(c)(ii)

10 marks

Att 3



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

*Other methods allowed (i) One set of arcs only and setsquare used to drop perpendicular
(ii) As per dividing in three or more segments

Blunders (-3)

- B1 Arc(s) from P incorrect
- B2 Arc(s) from Q incorrect
- B3 Bisector not drawn
- B4 Unequal subdivisions of construction line in method (ii)
- B5 Second arc not joined to P or Q in method (ii)
- B6 Parallel line omitted in method (ii)

Attempts (3 marks)

- A1 Any relevant step
- A2 Divides line by measurement
- A3 Draws a construction line from P or Q

QUESTION 4

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

(a)	10 marks	Att 3
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Find the value of $5a + 8b$ when $a = 2$ and $b = 3$.

(a)	10 marks	Att 3
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$$\begin{aligned}5a + 8b \\ &= 5(2) + 8(3) \\ &= 10 + 24 \\ &= 34\end{aligned}$$

Blunders (-3)

- B1 Correct answer without work ($\not\approx$)
- B2 Mathematical error, $(5(2) + 8)3 = 54$ or similar
- B3 Mathematical error e.g. $5(2) + 8(3) = 52 + 83 = 135$
- B4 Not finishing, $5(2) + 8(3)$ and stops.
- B5 Wrong operator and continues e.g. $(5 + 2 + 8 + 3 = 18)$

Slips (-1)

- S1 Arithmetic error in calculation to maximum -3

Misreadings (-1)

- M1 Error in copying down a component or digit
- M2 $5(3) + 8(2) = 15 + 16 = 31$

Attempts (3marks)

- A1 Partial substitution
- A2 18 or 31 or 135 without work

(b) (i)	10 marks	Att 3
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Solve for x : $2x - 4 = 10$

(b) (i)	10 marks	Att 3
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$$\begin{aligned}2x - 4 &= 10 \\ 2x &= 14 \\ x &= 7\end{aligned}$$

*Accept successful trial and error with work. But 7 must appear. Otherwise a blunder

Blunders (-3)

- B1 Correct answer without work ($\not\approx$)
- B2 Transposition error (each time).
- B3 Mathematical error e.g. $2x - 4 = 2x$
- B4 Ignores 10 and continues. i.e. $2x = 4$ and $x = 2$.
- B5 Stops at $2x = 14$

Slips (-1)

- S1 Numerical errors in calculation to maximum -3
- S2 Leaves answer as $14/2$ or similar

Misreadings (-1)

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

Attempts (3marks)

- A1 Unsuccessful trial and error
- A2 Special cases: $x = 12$ or 12 (with no work)
 $x = 14$ or 14 (with no work)
 $x = 3$ or 3 (with no work)

Worthless (0)

- W1 Incorrect answer, no work shown but check A2

(b)(ii)	10 marks	Att 3
Simplify fully	$x(x + 7) + 3(x - 4)$.	
(b)(ii)	10 marks	Att 3
	$x(x + 7) + 3(x - 4)$ $= x^2 + 7x + 3x - 12$ $= x^2 + 10x - 12$	

Blunders (-3)

- B1 Correct answer without work (\neq)
- B2 Distribution error
- B3 Mathematical error e.g. $x^2 + 7x = 8x$

Slips (-1)

- S1 Arithmetic errors in calculation, to maximum -3
- S2 Sign error

Misreadings (-1)

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

Attempts (3marks)

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

Worthless (0)

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

(c)(i)

10 marks

Att 3

Given that $y = 3x + 4$, complete the table below.

x	1	2	3	4
y			13	

(c)(i)

10 marks

Att 3

x	1	2	3	4
y	7	10	13	16

$$y = 3x + 4$$

$$x = 1 \Rightarrow y = 3(1) + 4 \quad \therefore y = 7$$

$$x = 2 \Rightarrow y = 3(2) + 4 \quad \therefore y = 10$$

$$x = 4 \Rightarrow y = 3(4) + 4 \quad \therefore y = 16$$

* Answers need not be written in table

* Correct answers without work merit full marks

Blunders (-3)

B1 Omitted or incorrect entry

Slips (-1)

S1 Adds in top line of table (8, 12, 16, 20) or (8, 12, 13, 20)

S2 Arithmetic error in calculation to maximum -3

Misreadings (-1)

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

Attempts (3 marks)

A1 11, 12, 13, 14

Worthless (0)

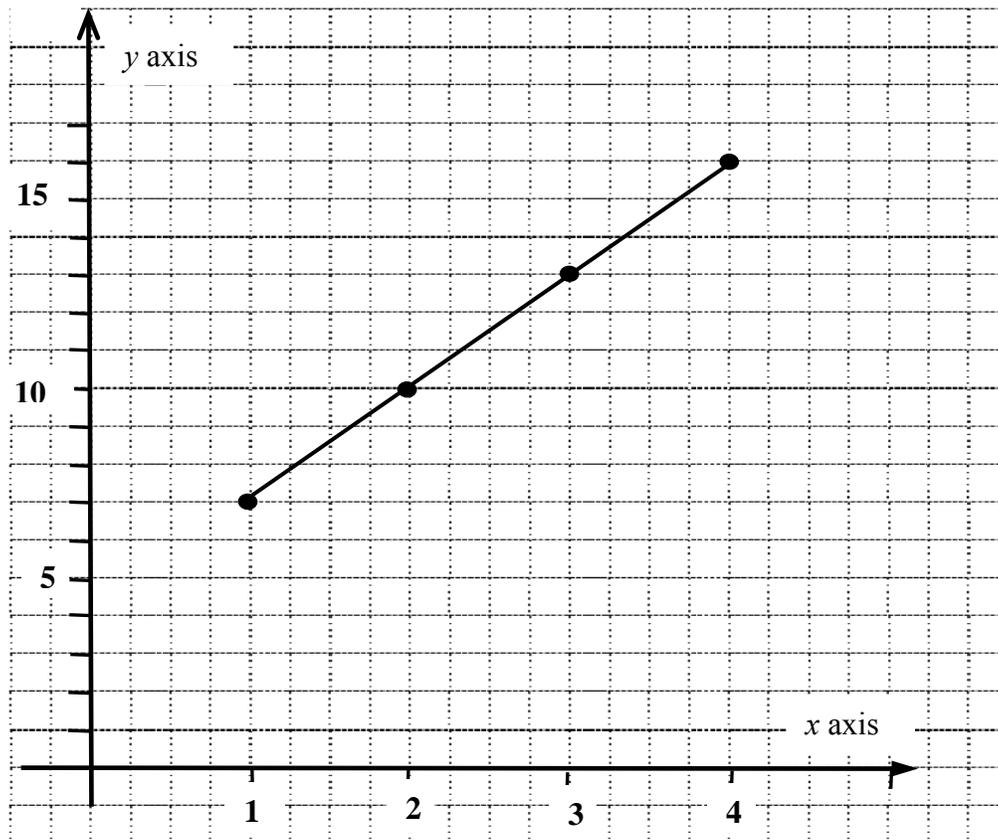
W1 Table completed with spurious numbers

(c)(ii)

10 marks

Att 3

Using your answers from (i), draw the graph of $y = 3x + 4$ from $x = 1$ to $x = 4$.



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

* Allow candidate's work from (i)

* Ignore join to origin

Blunders (-3)

B1 Scale error (once only)

Slips (-1)

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

S2 All points not joined.

S3 Each incorrectly plotted point [subject to S1]

Attempts (3marks)

A1 Random straight line or lines

A2 One correct point

QUESTION 5

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

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

A concert starts at 20:15 and lasts 2 hours and 50 minutes.
At what time does the concert finish?

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

20:15 + 2:50 = 22:65	Finished at 23:05 or 11:05	8:15 + 2:50 = 10:65
22:65 = 23:05		10:65 = 11:05

Blunders (-3)

- B1 Correct answer without work (✍)
- B2 22:65 or 10:65 and stops
- B3 1 hour ≠ 60 minutes

Slips (-1)

- S1 Arithmetic error in calculation

Misreadings (-1)

- M1 Error in copying down a digit
- M2 20:15 – 2:50 = 17:25 or 5:25

Attempts (3marks)

- A1 Some work of merit
- A2 17:25 or 5:25 without work

Worthless (0)

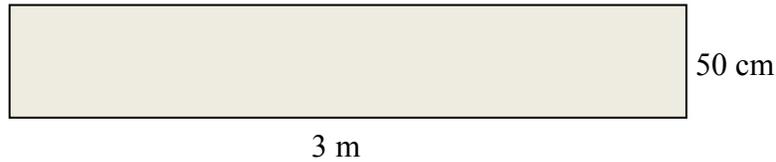
- W1 Incorrect answer without work but see A2

Part (b)

20 (5,5,10)marks

Att (2,2,3)

A rectangular wooden panel is 3 metres long and 50 centimetres wide.



(b)(i)

5 marks

Att 2

Write the width of the panel in metres. [1 m = 100 cm]

(b)(i)

5 marks

Att 2

50 cm = 0.5 metres

*No penalty for omission of units or inclusion of incorrect units

*No penalty for work not shown: no ✍

Blunders (-3)

B1 1m not equal to 100cm

B2 Multiplies by 100

Slips (-1)

S1 Arithmetic error in calculation (once only)

S2 Decimal error

Misreadings (-1)

M1 Error in copying down a digit

Attempts (2 marks)

A1 Answer with correct digits but incorrect decimal location (with no work)

A2 0.03 or 3 or 300 with or without work

(b)(ii)

5 marks

Att 2

Calculate the area of the panel in m^2 .

(b)(ii)

5 marks

Att 2

Area of panel = $3 \times 0.5 = 1.5 \text{ m}^2$

* No penalty for omission of units or inclusion of incorrect units

* Accept candidates incorrect answer from (b) (i)

Blunders (-3)

B1 Correct answer without work (✍)

B2 $3 \times 50 = 150$

B3 Answer left as 3×0.5

B4 Mathematical error e.g. incorrect operator (with work shown):

$3.5(+)$, $2.5(-)$, $6(\div)$, $0.166(\div)$, $2.25(3^2 \times 0.5^2)$ or equivalent with answer from (b) (i)

B5 Incorrect formula used with work e.g. $2 \times 3 + 2 \times 0.5 = 7$ or $\frac{1}{2} \text{ base} \times \text{height} = 0.75$
or equivalent with answer from (b) (i)

Slips (-1)

S1 Arithmetic error in calculation to a maximum -3

S2 Decimal error

Misreadings (-1)

M1 Error in copying down a digit once only

M2 $300 \times 50 = 15000$

Attempts (2marks)

A1 Mentions length, width, breadth, base or height

A2 Answers from B2 or B4 or B5 or M2 without work.

Worthless (0)

W1 Copies diagram as is

W2 Incorrect answer without work, but check A2

W3 Incorrect formula with π , and stops

(b)(iii)

10 marks

Att 3

How many of these panels are needed to cover a rectangular area that measures 3 m × 5 m?

(b)(iii)

10 marks

Att 3

Total area = $3 \times 5 = 15 \text{ m}^2$
Area of one panel = 1.5 m^2
Number of panels = $15 \div 1.5$
Need 10 panels

* Accept candidate's incorrect answer from (b) (ii)

Blunders (-3)

B1 Correct answer without work ()

B2 Answer left as $15 \div 1.5$

B3 Mathematical error e.g. incorrect operator (with work shown):

B4 Incorrect formula with work e.g. $2 \times \text{length} + 2 \times \text{breadth}$ or $\frac{1}{2} \text{ base} \times \text{height}$

Slips (-1)

S1 Arithmetic error in calculation to a maximum -3

S2 Decimal error

Misreadings (-1)

M1 Error in copying down a digit once only

Attempts (3marks)

A1 Work of some merit.

Part (c)

20 marks (5,10,5)

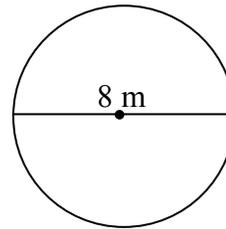
Att (2,3,2)

(c)(i)

5 marks

Att 2

A circular pond has a diameter of length 8 m.



Write down the length of the radius of the pond.

(c)(i)

5 marks

Att 2

Radius = 4 m

* No penalty for omission of units or inclusion of incorrect units

* Accept correct answer without work

* Answer may appear on diagram

Blunders (-3)

B1 Multiplies 8 by 2

Slips (-1)

S1 Arithmetic error in calculation

Misreadings (-1)

M1 Error in copying down a digit

Attempts (2marks)

A1 Indicates diameter or radius on a sketch/diagram

A2 A phrase which attempts a definition of diameter or radius

A3 8 used with work

Worthless (0)

W1 Incorrect answer without work, but note B1

(c)(ii)

10 marks

Att 3

Calculate the circumference of the pond taking $\pi = 3.142$.

(c)(ii)

10 marks

Att 3

$$\text{Circumference} = 2\pi r$$

$$C = 2 \times 3.142 \times 4$$

$$\therefore C = 25.136 \text{ metres}$$

*No penalty for using π from calculator (with work)

Blunders (-3)

B1 Correct answer without work (\sphericalangle)

B2 Each incorrect or omitted substitution

B3 Mathematical error or incorrect substitution

B4 Value of π not used in calculation i.e. $2 \times 4 = 8$

B5 Calculates area

Slips (-1)

- S1 Arithmetic error in calculation to maximum -3
- S2 Decimal error
- S3 Gives answer as 8π

Misreadings (-1)

- M1 Error in copying down a digit

Attempts (3 marks)

- A1 Writes $2\pi r$ or πr^2 and stops.
- A2 Special cases: 8, 6.284, $44/7$, $88/7$, 12.568 without work

Worthless (0)

- W1 Incorrect answer without work but see A1 and A2
- W2 Incorrect formula without π and stops

(c)(iii)

5 marks

Att 2

Calculate the surface area of the pond taking $\pi = 3 \cdot 142$.

(c)(iii)

5 marks

Att 2

$$\begin{aligned}\text{Surface Area} &= \pi r^2 \\ \text{SA} &= 3 \cdot 142 \times (4)^2 \\ &= 3 \cdot 142 \times 16 \\ &= 50 \cdot 272 \text{ m}^2\end{aligned}$$

*No penalty for using π from calculator (with work)

*Accept correct circumference if correct area worked out in (c) (ii)

Blunders (-3)

- B1 Correct answer without work (\neq)
- B2 Each incorrect or omitted substitution
- B3 Mathematical error eg $4^2=8$
- B4 Value of π not used in calculation i.e. $4^2=16$
- B5 Calculates perimeter

Slips (-1)

- S1 Arithmetic error in calculation to maximum -3
- S2 Decimal error
- S3 Gives answer as 16π

Misreadings (-1)

- M1 Error in copying down a digit

Attempts (2 marks)

- A1 Writes $2\pi r$ or πr^2 and stops.
- A2 Special cases 16, 12.568, 12.566, $88/7$ without work

Worthless (0)

- W1 Incorrect answer without work but see A2
- W2 Incorrect formula without π and stops

QUESTION 6

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

Write $\frac{1}{2}$ as a decimal.

(a)(i) **5 marks** **Att 2**

$$\frac{1}{2} = 0.5$$

*No penalty for work not shown: no ✘

Blunders (-3)

B1 Fraction inverted, i.e. 2.0

Slips (-1)

S1 Decimal error

S2 Arithmetic error in calculation

Attempts (2 marks)

A1 Any effort at division and stops

A2 1.2 or 2.1

A3 50%

Worthless (0)

W1 Incorrect answer without work but check B1, A2, A3

(a)(ii) **5 marks** **Att 2**

Write $\frac{1}{4}$ as a percentage.

(a)(ii) **5 marks** **Att 2**

$$\frac{1}{4} = 25\%$$

*No penalty for work not shown: no ✘

Blunders (-3)

B1 Incorrect numerator

B2 Incorrect denominator

B3 Divides by 100

B4 Fails to finish

Slips (-1)

S1 Arithmetic error in calculation

S2 Decimal error

Attempts (2 marks)

A1 Any use of 100

A2 0.25

Worthless (0)

W1 Incorrect answer without work but see A1 and A2

Part (b)

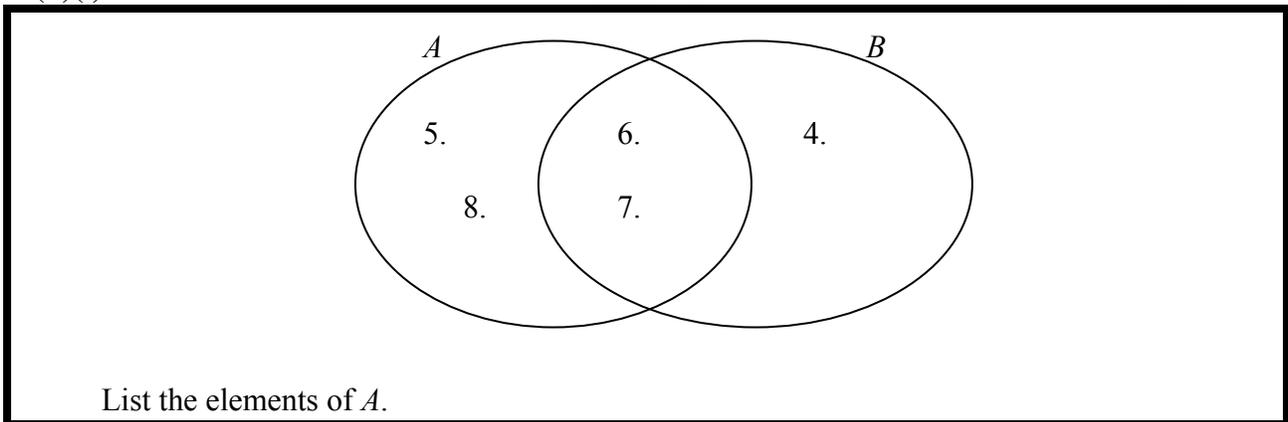
20(5,5,5,5) marks

Att (2,2,2,2)

(b)(i)

5 marks

Att 2



(b)(i)

5 marks

Att 2

$$A = \{ 5, 6, 7, 8 \}$$

* Accept appropriate shading.

Slips (-1)

S1 Each incorrect or omitted element to maximum -3

Attempts (2 marks)

A1 An element of $B \setminus A$

Worthless (0)

W1 No element of A or B in answer

(b)(ii)

5 marks

Att 2

List the elements of B .

(b)(ii)

5 marks

Att 2

$$B = \{ 4, 6, 7 \}$$

* Accept appropriate shading

Slips (-1)

S1 Each incorrect or omitted element to maximum -3

Attempts (2 marks)

A1 An element of $A \setminus B$

Worthless (0)

W1 No element of A or B in answer

(b)(iii)

5 marks

Att 2

List the elements of $A \cap B$.

(b)(iii)

5 marks

Att 2

$$A \cap B = \{ 6, 7 \}$$

* Accept appropriate shading

Blunders (-3)

B1 Shades or lists Union

Slips (-1)

S1 Each additional or incorrect element to maximum -3

Attempts (2 marks)

A1 Mentions 'together' or similar

Worthless (0)

W1 No element of A or B in answer

(b)(iv)

5 marks

Att 2

List the elements of $A \cup B$.

(b)(iv)

5 marks

Att 2

$$A \cup B = \{ 4, 5, 6, 7, 8 \}$$

* Accept appropriate shading.

Blunders (-3)

B1 Shades or lists intersection

Slips (-1)

S1 Each incorrect or omitted element to maximum -3

Attempts (2 marks)

A1 Defines union

Worthless (0)

W1 No element of A or B in answer

Part (c)

20 (10,5,5)marks

Att (3,2,2)

(c)(i)

10 marks

Att 3

Neela works in a sports complex.

She has a gross salary of €26 000 per year.

Tax is paid at 20%.

What is the total tax due per year on Neela's gross salary?

(c)(i)

10 marks

Att 3

$$\text{Tax} = 26000 \times 0.2$$

$$\text{Tax due} = \text{€}5200$$

Blunders (-3)

B1 Correct answer without work

B2 $20\% = 100/20$

B3 20% not equal to 0.2 or 1/5

B4 Fails to finish

B5 No use of 100

Slips (-1)

S1 Arithmetic error in calculation to maximum -3

S2 Decimal error

Misreadings (-1)

M1 Error in copying down a digit

Attempts (3 marks)

A1 Any relevant step or mentions 100 and stops

A2 Any mention of 0.2 or 1/5

(c)(ii)

5 marks

Att 2

Neela has tax credits of €1800 per year.
Calculate how much tax she pays each year.

(c)(ii)

5 marks

Att 2

Tax paid = €5200 – €1800

Tax paid = €3400

*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 to maximum -3

S2 Decimal error

Misreadings (-1)

M1 Error in copying down a digit

Attempts (2 marks)

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

(c)(iii)

5 marks

Att 2

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

(c)(iii)

5 marks

Att 2

Take home pay = €26 000 – €3400

Take home pay = €22 600

*Accept candidate's answer from Part (ii)

Blunders (-3)

B1 Correct answer without work

B2 Addition instead of subtraction

Slips (-1)

S1 Arithmetic error in calculation to 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