MARKING SCHEME
JUNIOR CERTIFICATE EXAMINATION 2007
MATHEMATICS - ORDINARY LEVEL - PAPER 1

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.
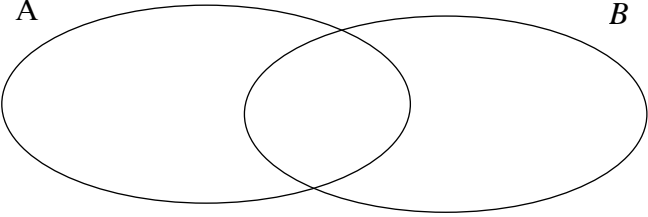
12. Do not penalise the use of a comma for a decimal point, e.g. €5.50 may be written as €5,50.
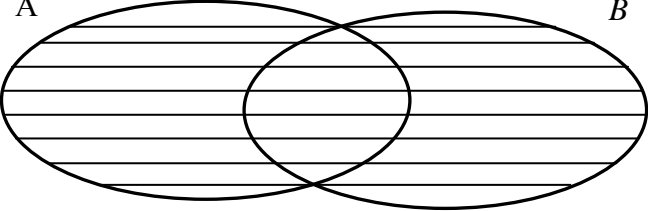
QUESTION 1

Part (a)	10(5, 5) marks	Att 4(2, 2)
Part (b)	20(5, 5, 5, 5) marks	Att 8(2, 2, 2, 2)
Part (c)	20(5, 5, 5, 5) marks	Att 8(2, 2, 2, 2)

Part (a) (i)	5 marks	Att 2

1(a) (i)   Using the Venn diagram below, shade in the region that represents $A \cup B$.

Part (a) (i)	5 marks	Att 2

Blunders (-3)
B1   Any incorrect indication other than the misreading below.

Misreadings (-1)
M1 $A \cap B$ indicated.

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

1(a) (ii)   Using the Venn diagram below, shade in the region that represents $A \cap B$.

A   B

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

A   B

Blunders (-3)
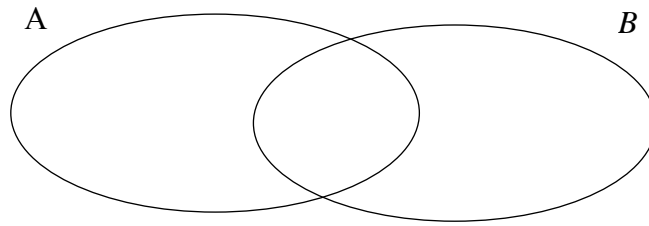B1   Any incorrect indication other than the misreading below.
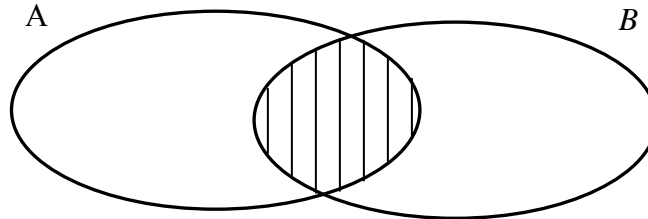
Misreading (-1)
M1 $A \cup B$ indicated.

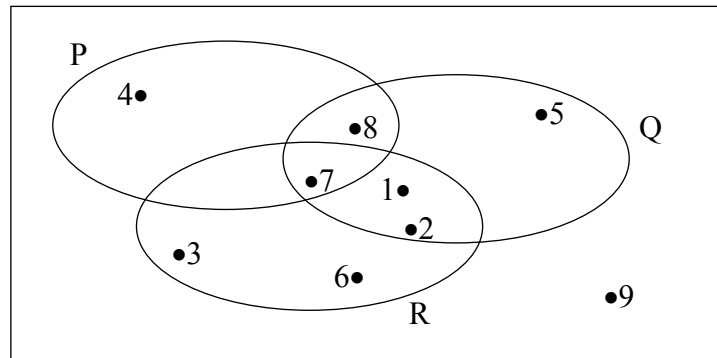**Part (b)**   **20(5, 5, 5, 5) marks**   **Att(2,2,2,2)**

1(b)

U is the universal set

$P = \{4, 7, 8\}$

$Q = \{1, 2, 5, 7, 8\}$

$R = \{1, 2, 3, 6, 7\}$

Part (b) (i)   **5 marks**   **Att 2**

1(b) (i)   List the elements of: $P \cup Q$.

Part (b) (i)   **5 marks**   **Att 2**

$$P \cup Q = \{1, 2, 4, 5, 7, 8.\}$$

Blunders (-3)
B1   Any incorrect set of elements of P and Q other than the misreading as below.

Misreadings (-1)
M1 $P \cap Q$ giving $\{7, 8\}$.

Attempts (2 marks)
A1   3 or 6 or 9 appear in the answer.

Part (b) (ii)   **5 marks**   **Att 2**

1(b) (ii)   List the elements of: $P \setminus R$.

Part (b) (ii)   **5 marks**   **Att 2**

$$P \setminus R = \{4, 8\}$$

Blunders (-3)
B1   Any incorrect set of elements of P and R other than the misreading as below.
       e.g. $\{P \setminus (Q \cup R)\} = \{4\}$.

Misreadings (-1)
M1 $R \setminus P$ giving $\{1, 2, 3, 6\}$.

Attempts (2 marks)
A1   5 or 9 appear in the answer.

Part (b) (iii)   **5 marks**   **Att 2**

1(b) (iii)   List the elements of: $(P \cup R) \cap Q$

$$(P \cup R) \cap Q = \{1,\ 2,\ 7,\ 8\}$$

Blunders (-3)
B1   Any incorrect set of elements of P and Q and R other than the misreading as below.
B2 $P \cup R = \{1,2,3,4,6,7,8\}$.

Misreadings (-1)
M1 $(P \cap R) \cup Q$ giving $\{1, 2, 5, 7, 8\}$.
M2 $(P \cup R) \cup Q$ giving $\{1, 2, 3, 4, 5, 6, 7, 8\}$.
M3 $(P \cap R) \cap Q$ giving $\{7\}$.

Attempts (2 marks)
A1   9 appears in the answer.

Part (b) (iv)   **5 marks**   **Att 2**

1(b) (iv)   List the elements of: $(P \cup Q)^{/}$

$$(P \cup Q)^{/} = \{3,\ 6,\ 9\}$$

Blunders (-3)
B1   Any incorrect set of elements of P and Q other than the misreading as below.
B2 $(P \cup Q) = \{1, 2, 4, 5, 7, 8\}$ in this part.

Misreadings (-1)
M1 $(P \cap Q)^{/}$ giving $\{1, 2, 3, 4, 5, 6, 9,\}$.
M2 $P^{/} \cup Q^{/}$ giving $\{1, 2, 3, 4, 5, 6, 9\}$.

Attempts (2 marks)
A1   Any incorrect listing of elements other than the misreadings above.

Part (c)   **20(5,5,5,5)marks**   **Att(2,2,2,2)**
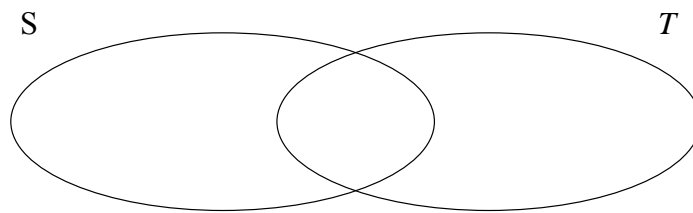
1(c) In a class, all the students study Science (*S*) or Technical Graphics (*T*).
      A number of the students study both of these subjects.
      22 students study Science. 12 students study Technical Graphics
      8 study both subjects.
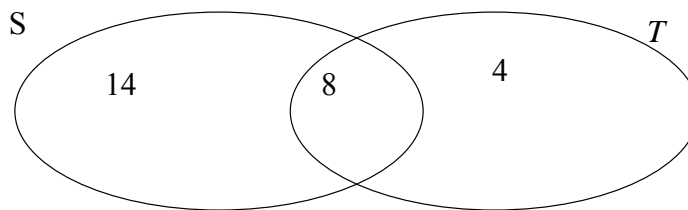
Part (c) (i)   **5 marks**   **Att 2**

1(c) (i)   Represent this information in the Venn diagram below.

S   *T*

Part (c) (i)   **5 marks**   **Att 2**

S   *T*

          14   8   4

Blunders (-3)
B1   Incorrect Venn diagram subject to S1 below.

Slips (-1)
S1   Numerical errors where work is clearly shown to a max of 3.

Misreadings (-1)
M1   Interchanges Technical Graphics and Science.

Attempts (2 marks)
A1   Any one correct relevant entry.
A2   Incorrect work with numbers 8, 12, and 22. (work shown)

Part(c) (ii)	5 marks	Att 2
1(c) (ii)	How many students study Science only?	

Part(c) (ii)	5 marks	Att 2
	14	

* A correct answer written here in the space provided takes precedence over an incorrect Venn diagram.
* Accepts candidates work from previous part c (i).
* If no work appears here, award **2** marks if the correct answer appears in the Venn diagram.

Blunders (-3)

B1 Any incorrect use of the given numbers or the numbers from the candidates incorrect Venn diagram. {Subject to S1}.

Slips (-1)

S1 Numerical errors where work is clearly shown to a max of 3.

Misreadings (-1)

M1 Science read as Technical Graphics.

Attempts (2 marks)

A1 Incorrect work with numbers 8, and/or 22. (work shown)

Part(c) (iii)	5 marks	Att 2
1(c) (iii)	How many students are there in the class?	

Part(c) (iii)	5 marks	Att 2
	26	

* A correct answer written here in the space provided takes precedence over an incorrect Venn diagram.
* Accepts candidates work from previous part c (i), c (ii).
   Note: Answer c (ii) + 12 added correctly merits full marks.

Blunders (-3)

B1 Any incorrect use of the given numbers or numbers from the candidates incorrect Venn diagram. {Subject to 2nd * above}.

Slips (-1)

S1 Numerical errors where work is clearly shown to a max of 3.
S2 Written as 14 + 8 + 4.

Attempts (2 marks)

A1 Incorrect work with numbers 14, 8,4,12 or 22.

Part(c) (iv)	**5 marks**	**Att 2**
1(c) (iv)	How many students study only one of the two subjects?	

Part(c) (iv)	**5 marks**	**Att 2**
	18	

* A correct answer written here in the space provided takes precedence over an incorrect Venn diagram.
* Accepts candidates work from previous part c (i), c (ii) and c (iii).

Note: Answer c (iii) - 8 merits full marks.

Blunders (-3)

B1 Any incorrect use of the given numbers or numbers from the candidates incorrect Venn diagram. {Subject to 2nd * above}.

Slips (-1)

S1 Numerical errors where work is clearly shown to a max of 3.
S2 Written as 14 + 4.

Attempts (2 marks)

A1 Incorrect work with numbers 14, 8, 4, 12, or 22.

QUESTION 2

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

Part (a)	10 marks	Att 3

> 2(a) €6650 was shared between Ciarán and Sheila in the ratio 2:5.
> How much did each receive?

✍

2 parts : 5 parts $\Rightarrow \dfrac{6650}{7} = 950$ Ciaran = $950 \times 2 = €1900$ Sheila = $950 \times 5 = €4750$	$2 + 5 = 7$ $\dfrac{1}{7} = 950$ $\Rightarrow \dfrac{2}{7} = €1900$ (C) $\Rightarrow 6650\text{-}1900 = €4750$ (S)	$2x : 5x$ $\Rightarrow 7x = 6650$ $\Rightarrow x = 950$ $\Rightarrow 2x = €1900$ (C) $\Rightarrow 5x = €4750$ (S)

Blunders (-3)

B1   Correct answer without work. ✍
B2   Divisor $\neq 7$ only and continues.
B3   Incorrect multiplier or fails to multiply. (each time).
B4   Error in transposition.
B5   Fails to find second amount.
B6   Adds instead of subtracts.   e.g. $6650 + 1900 = 8550$.

Slips (-1)
S1   Numerical errors to a max of 3.

Misreadings (-1)
M1   Interchanges Ciaran and Sheila.

Attempts (3 marks)

A1   Divisor $\neq 7$ e.g. $\dfrac{6650}{2}$ and/or $\dfrac{6650}{5}$ and stops.

A2   Indicates 7 parts or 2 parts or 5 parts or $\dfrac{2}{7}$ or $\dfrac{5}{7}$ or 2+5=7 and stops.

A3   Indicates multiplication of 6500 by 2 and/or 5 and stops.
A4   Both answers added together equal €6650. (No work shown).

Worthless (0)
W1   Incorrect answer without work. {Subject to A4}.

Part (b) (i)   **5 marks**   **Att 2**

2(b) (i)	Simplify $\dfrac{a^8 \times a^{10}}{a^5 \times a^7}$, giving your answer in the form, a^n where $n \in \mathbf{N}$.

Part (b) (i)   **5 marks**   **Att 2**

✍ $\dfrac{a^8 \times a^{10}}{a^5 \times a^7} = \dfrac{a^{18}}{a^{12}} = a^6$	$\left(\dfrac{a^8}{a^5}\right) \times \left(\dfrac{a^{10}}{a^7}\right) = a^3 \times a^3 = a^6$	$\dfrac{a}{a} \times \dfrac{a}{a} \ldots\ldots \dfrac{a}{a} \ldots\ldots = a^6$

Blunders (-3)
B1   Correct answer without work. ✍
B2   Error in calculation involving indices.
B3   Error in number of a's in the extended form.
B4   Error in elimination in the extended form.
B5   Fails to finish.

Slips (-1)
S1 $\dfrac{a^{18}}{a^{12}} = 6$
S2   Answer left $a \times a \times a \times a \times a \times a$.

Attempts (2 marks)
A1   Some correct manipulation of indices. e,g, 8+10, $\dfrac{18}{12}$, a^3, a^5, *or* a and stops.

Worthless (0)
W1   Incorrect answer without work.

2(b) (ii)   By rounding each of these numbers to the nearest whole number, estimate the value of $\dfrac{24 \cdot 092}{6 \cdot 1 - 2 \cdot 93}$.

Part (b) (ii)   **10 marks**   **Att 3**

✎ $\dfrac{24 \cdot 092}{6 \cdot 1 - 2 \cdot 93}$ is approximately equal to

$$\frac{\boxed{24}}{\boxed{6} - \boxed{3}} = \frac{\boxed{24}}{\boxed{3}} = \boxed{8}$$

* $\dfrac{24}{6-3}$ and stops $\Rightarrow$ 4 marks.

*   No penalty if the intermediate step between approximations and final answer is not shown.

      i.e $\dfrac{24}{3}$ not shown.

*   Special Case: $\dfrac{24 \cdot 092}{6 \cdot 1 - 2 \cdot 93} = 7 \cdot 6$ presented in this part $\Rightarrow$ Attempt 3 marks.

Blunders (-3)
B1   Correct answer without work.   ✎
B2   Error(s) in rounding off to the nearest whole number.
B3   Decimal error in calculation of final value.
B4   An arithmetic operation other than indicated.

B5   Error(s) in the manipulation of the denominator. e.g. $\dfrac{24}{6} - \dfrac{24}{3}$ or similar.

Slips (-1)
S1   Numerical errors to a max of 3.

Attempts (3 marks)
A1   Only one or two approximations made to the given numbers and stops.
A2   No rounding off applied to given numbers.

Worthless (0)
W1   Incorrect answer without work.

Part (b) (iii)   **5 marks**   **Att 2**

> 2(b)(iii)   Using a calculator, or otherwise, find the exact value of $\dfrac{24\cdot092}{6\cdot1-2\cdot93}$.

Part (b) (iii)   **5 marks**   **Att 2**

$$\frac{24\cdot092}{6\cdot1-2\cdot93}=\frac{24\cdot092}{3\cdot17}=7\cdot6$$

Blunders (-3)
B1   Decimal error.

B2   Treats as $\dfrac{24\cdot092}{6\cdot1}-2.93=3\cdot949508197-2\cdot93=1\cdot019\ldots.$ {B1 may occur}.

B3   Treats as $24\cdot092-\dfrac{24\cdot092}{2\cdot93}=24\cdot092-8\cdot2225=15\cdot8695..$ {B1 may occur}.

B4   Treats as $\dfrac{24\cdot092}{6\cdot1+2\cdot93}=\dfrac{24\cdot092}{9\cdot03}=2\cdot66799$. {B1 may occur}.

B5   Treats as $\dfrac{24\cdot092}{6\cdot1\times2\cdot93}=\dfrac{24\cdot092}{17\cdot873}=1\cdot347955016$. {B1 may occur}.

B6   Treats as $24\cdot092-\dfrac{24\cdot092}{3\cdot17}=24\cdot092-7\cdot6=16\cdot492$. {B1 may occur}.

B7   Treats as $\dfrac{24\cdot092}{6\cdot1}-\dfrac{24\cdot092}{2\cdot93}=3\cdot9495-8\cdot2225....=-4\cdot2755$. {B1 may occur}.

Slips (-1)
S1   Numerical errors to a max of 3.
S2   Any rounding off.

Attempts (2 marks)
A1   Any correct relevant calculation and stops.

Worthless (0)
W1   Incorrect answer without work.

Part(c) (i)   **5 marks**   **Att 2**

2(c) (i)   Using a calculator, or otherwise, find the exact value of $(2 \cdot 25)^{\frac{1}{2}}$ **.**

Part(c) (i)   **5 marks**   **Att 2**

$$(2 \cdot 25)^{\frac{1}{2}} = \frac{3}{2} = 1 \cdot 5$$

Blunders (-3)

B1   Mishandles $(2 \cdot 25)^{\frac{1}{2}}$ e.g. $(2 \cdot 25)^2 = 5 \cdot 0625$.

B2   Decimal error.

Attempts (2 marks)

A1 $\sqrt{2 \cdot 25}$ and stops.

A2 $2 \cdot 25 \times \dfrac{1}{2} = 1 \cdot 125$.

Worthless(0)

W1 $2 \cdot 25 \times 2$ or $2 \cdot 75$.

Part(c) (ii)   **5 marks**   **Att 2**

2(c) (ii)   Using a calculator, or otherwise, multiply 54·5 by 60
               and express your answer in the form $a \times 10^n$, where $1 \le a < 10$ and $n \in \mathbf{N}$

Part(c) (ii)   **5 marks**   **Att 2**

✍ $54 \cdot 5 \times 60 = 3270 = 3 \cdot 27 \times 10^3$

Blunders (-3)

B1   Correct answer without work. ✍

B2   Decimal error.

Slips (-1)

S1   Numerical errors to a max of 3.

S2   Rounds off to, $3 \cdot 3 \times 10^3$ or $3 \cdot 0 \times 10^3$

S3   Incorrectly rounds off. e.g. $3 \cdot 2 \times 10^3$ also attracts S2.

S4   Incorrect format, where $a < 1$ *or* $a \ge 10$ and $n \notin \mathrm{N}$.

Attempts (2 marks)

A1   Any relevant step. e.g. Partial multiplication.

Part(c) (iii)   **10 marks**   **Att 3**

2(c) (iii)   Using a calculator, or otherwise, evaluate

$$(6 \cdot 9)^2 - \sqrt{139 \cdot 8} \div 3 \cdot 55.$$

Give your answer correct to two decimal places

✎

$= 47 \cdot 61 - 11 \cdot 823705 \div 3 \cdot 55$

$= 47 \cdot 61 - 3 \cdot 330621127$

$= 44 \cdot 27937887$

$= 44 \cdot 28$

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*   Correct answer (without work) incorrectly rounded off $\Rightarrow$ **6** marks

Blunders (-3)

B1   Correct answer without work. ✎

B2   Mishandles $(6 \cdot 9)^2$.

B3   Mishandles $\sqrt{139 \cdot 8}$.

B4   Error in $11 \cdot 823705 \div 3 \cdot 55$ or candidate's equivalent from previous work.

B5   Error in $47 \cdot 61 - 3 \cdot 330621127$ or candidate's equivalent from previous work.

B6   Decimal error.

B7   Subtracts before Division $35 \cdot 786295 \div 3 \cdot 55 = 10 \cdot 08064648 = 10 \cdot 08$ {Note S2,S3 }

B8   Use of mathematical operator other than that which is indicated.

B9   Works as $47 \cdot 61 \div 3 \cdot 55 - 11 \cdot 823705 = 1 \cdot 587562606 = 1 \cdot 59$.{Note S2,S3 }

Slips (-1)

S1   Numerical errors to a max of 3.

S2   Each premature rounding off that effects the final answer to a max of 3.

S3   Fails to round off or rounds off incorrectly when giving final answer.

Attempts (3 marks.)

A1   Any correct relevant step e.g. $(6 \cdot 9)^2 = 47 \cdot 61$, $\sqrt{139 \cdot 8} = 11 \cdot 823705$.

QUESTION 3

Part (a)	10 marks	Att 3
Part (b)	20(10, 10) marks	Att 6(3, 3)
Part (c)	20(10, 10) marks	Att 6(3, 3)

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

> 3(a) In one week Bríd sent 26 text messages on her mobile phone
>   11 of these messages cost 8c each
>   The rest of the text messages cost 12c each.
>   Find the total cost of Bríd's texting.

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

✍	
$26 - 11 = 15$	$26 - 11 = 15$
$11 \times 8 = 88$	$8 + 8$ …..11 Times $= 88$
$15 \times 12 = 180$	$12 + 12$ ….15 Times $= 180$.
Total Cost $= 268c$ (€$2 \cdot 68$)	*Total Cost* $= 268c$ (€$2 \cdot 68$)

* No penalty for omission of € symbol.
* Accept 268c, (€$2 \cdot 68$)
* Adds $8 + 12 = 20$ and stops merits 3 marks (Oversimplification).

Blunders (-3)

B1   Correct answer without work. ✍
B2   Fails to subtract 11 from 26.
B3   Each missing product when finding each cost e.g. 11 not multiplied by 8.
B4   Each missing item when finding total cost e.g. Expensive texts omitted.
B5   Fails to find total cost i.e. no addition.
B6   Operation other than addition when finding total cost.
B7   Decimal error e.g. €$26 \cdot 8$ (Note: 1st* above).

Slips (-1)
S1   Numerical errors to a max of 3.

Misreadings (-1)
M1   15 texts @ 8c and 11 texts @ 12c.

Attempts (3 marks)
A1   Any attempt at addition /multiplication.

Worthless (0)
W1   Incorrect answer without work.

Part (b) (i)   **10 marks**   **Att 3**

3(b) (i)   John's gross pay is €23 000. His tax credit is €3400
He pays income tax at the rate of 20%
Find John's take-home pay.

Part (b) (i)   **10 marks**   **Att 3**

✍

Gross Pay	€23 000
Tax @ 20%	€4600
Tax Credit	€3400
Tax-Due	€1200
Take-home Pay	€21,800

$$\text{Tax} = 23{,}000 \times \frac{20}{100} = 4600$$

or $23{,}000 \times 0.2 = 4600$

Tax Due = 4600 – 3400
         = 1200
Take-home Pay = 23000 - 1200

         = €21,800

Blunders (-3)

B1   Correct answer without work. ✍
B2   Mishandles 20% of 23,000. {Must use 23 000}
B3   Decimal error.
B4   Misuse of Tax Credit
B5   Incorrect use of Tax Amount.
B6   Fails to finish. {B4 may apply}

Slips (-1)
S1   Numerical errors to a max of 3

Attempts (3 marks)
A1   Some use of 100 in attempt to find percentage e.g. $20\% = \frac{20}{100}$ and stops.

Worthless (0)
W1   Incorrect answer without work

Part (b) (ii)   **10 marks**   **Att3**

| 3(b) (ii) | VAT at 21% is added to a bill of €255 |
| | Calculate the total bill. |

Part (b) (ii)   **10 marks**   **Att3**

✍		
100 % = 255	$21\% = \dfrac{21}{100}$	$255 \times 1 \cdot 21$
$1\% = \dfrac{255}{100}$	$VAT = \dfrac{21}{100} \times 255$	Total Bill = €308·55
$121\% = \dfrac{255}{100} \times 121$	= 53.55	
= 2·55 121	Total Bill = 255 + 53·55	
Total Bill = €308·55	Total Bill = €308·55	

*   €53·55 without work and stops merits 4 marks.

Blunders (-3)

B1   Correct answer without work. ✍
B2   Decimal error
B3   Inverts $\dfrac{121}{100}$ or $\dfrac{21}{100}$ and continues (giving answers $210 \cdot 74$ or $1214 \cdot 29$).
B4   Mishandles 21%. e.g. 255×21 or $255 \div 21$. Note: {255 must be used}.
B5   255 taken as 121%.
B6   No addition of VAT (as per candidates work) to the bill.
B7   Subtraction of VAT (as per candidates work) from the bill.

Slips (-1)
S1   Numerical errors to a max of 3.

Misreadings (-1)
M1   Reads as €225.

Attempts (3 marks)

A1 $\dfrac{21}{100}$ and stops.
A2   100% = 255 and stops.
A3 $\dfrac{255}{100}$ and stops.
A4 $100 \times \dfrac{21}{255}$ and stops.
A5 $\dfrac{255}{21}$ and stops.
A6   Use of any other %.
A7   255 + 21% and stops.

Part(c) (i)   **10 marks**   **Att 3**

3(c) (i)	€15 000 is invested at 3% per annum
	What is the amount of the investment at the end of the first year?

Part(c) (i)   **10 marks**   **Att 3**

✍		
$1\% = \dfrac{15000}{100}$	$I = \dfrac{P \times R}{100}$	Amount $= 15000 \times 1 \cdot 03$
$3\% = \dfrac{15000}{100} \times 3$	$I = \dfrac{15000 \times 3}{100}$	Amount = €15 450
Interest = 450	$I = 450$	
Amount = 15000 + 450	Amount = 15000 + 450	
Amount = €15 450	Amount = €15 450	

*   €450 (without work) and stops $\Rightarrow$ 4 marks.

Blunders (-3)

B1   Correct answer without work. ✍

B2   Mishandles 3 %. e.g. $\dfrac{15000 \times 100}{3}$ Note: {15000 must be used}.

B3   Decimal error (once only).

B4   Stops at interest i.e. fails to calculate amount.

B5   Subtracts to calculate amount.

B6   Mathematical error(s) working with $\dfrac{15000 \times 3}{100}$.

B7 $1 \cdot 03$ treated as $1 \cdot 3$.

Slips (-1)

S1   Numerical errors to a max of 3.

Attempts (3 marks)

A1   Correct formula with or without substitution and stops.

A2   Some use of 100 in attempt to find percentage e.g. $3\% = \dfrac{3}{100}$ or $1 \cdot 03$ and stops.

A3   15000 + 3% and stops.

Worthless (0)

W1   Incorrect answer without work.

Part(c) (ii)   **10 marks**   **Att 3**

3(c) (ii)	€1450 is withdrawn from this amount at the beginning of the second year. The interest rate for the second year is 3·5%. What is the amount of the investment at the end of that year?

Part(c) (ii)   **10 marks**   **Att 3**

✍

Principal for second year = 15450 - 1450 = 14000		
$1\% = \dfrac{14000}{100}$	$I = \dfrac{P \times R}{100}$	Amount =$14000 \times 1\cdot035$
$3.5\% = \dfrac{14000}{100} \times 3\cdot5$	$I = \dfrac{14000 \times 3\cdot5}{100}$	Amount = €14 490
Interest = 490	$I = 490$	
Amount = 14000 + 490	Amount = 14000 + 490	
Amount = €14 490	Amount = €14 490	

* No penalty for consistent error(s) already penalised in (c) (i).
* Accept candidates work from previous part (c) (i).
* €490 (without work) and stops ⇒ 4 marks.
* €14000 (without work) and stops ⇒ 3 marks.

Blunders (-3)

B1 Correct answer without work. ✍
B2 Incorrect principal for second year.
B3 Incorrect interest rate for second year.
B4 Mishandles 3.5 %. e.g. $\dfrac{14000 \times 100}{3.5}$ see (1st * above)   Note:{14000 must be used}.
B5 Decimal error (once only).
B6 Stops at interest i.e. fails to calculate amount.
B7 Subtracts to calculate amount.
B8 Mathematical error(s) working with $\dfrac{14000 \times 3\cdot5}{100}$
B9 $1\cdot035$ treated as $1\cdot35$

Slips (-1)
S1 Numerical errors to a max of 3.

Attempts (3 marks)
A1 Correct formula with or without substitution and stops.
A2 Some use of 100 in attempt to find percentage e.g. $3\cdot5\% = \dfrac{3\cdot5}{100}$ or $1\cdot035$ and stops.
A3 $14000 + 3\cdot5\%$ and stops.

Worthless (0)
W1 Incorrect answer without work.

QUESTION 4

Part (a)	15(10, 5) marks	Att 5(3, 2)
Part (b)	15(10, 5) marks	Att 5(3, 2)
Part (c)	20(10, 10) marks	Att 6(3, 3)

Part(a)(i)	10 marks	Att 3

4(a)(i) If $x = 3$, find the value of : **(i)** $4x + 5$

✍ $4x + 5 = 4(3) + 5 = 12 + 5 = 17$

* $12 + 5 \Rightarrow 9$ marks.

Blunders (-3)

B1 Correct answer without work. ✍
B2 Leaves 4(3) in the answer.
B3 Incorrect substitution and continues
B4 Combines "x's" to "numbers" and continues. e.g. $4x + 5 = 9x = 9(3) = 27$.
B5 Breaks order i.e. [$4(3 + 5) = 32$].
B6 Treats 4(3) as 7 or 43 or similar.

Slips (-1)
S1 Numerical errors to a max of 3.

Attempts (3 marks)
A1 Substitutes for x and stops e.g. 4(3)
A2 Any correct step.

Worthless (0)
W1 Combines "x's" to "numbers" and stops.

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

4(a) (ii)   If $x = 3$, find the value of :   **(ii)** $2x^2 - 11$

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

✍ $2x^2 - 11 = 2(3)^2 - 11 = 2(9) - 11 = 18 - 11 = 7$

*   18 - 11 $\Rightarrow$ 4 marks.

Blunders (-3)

B1   Correct answer without work. ✍
B2   Leaves 2(9) in the answer.
B3   Mishandles $(3)^2$ e.g. $(3)^2 = 6$.
B4   Mishandles $2(3)^2$ e.g $2(3)^2 = (6)^2$.
B5   Mathematical error. e.g. 18 - 11 = - 7.
B6   Incorrect substitution and continues.
B7   Combines "x's" to "numbers" and continues. e.g. $2x^2 - 11x = -9x^2$
B8   Breaks order i.e. [$2(9 - 11) = -4$].
B9   Treats 2(9) as 11 or 29 or similar.

Slips (-1)
S1   Numerical errors to a max of 3.
      .
Attempts (2 marks)
A1   Substitutes for x and stops e.g. $2(3)^2$
A2   Any correct step.

Worthless (0)
W1   Combines "x^2" to "numbers" and stops.

Part (b) (i)   **10 marks**   **Att 3**

4(b)   (i)   Solve the equation $4(5x + 6) = 84$.

Part (b) (i)   **10 marks**   **Att 3**

$4(5x + 6) = 84$	$4(5x + 6) = 84$
$20x + 24 = 84$	$5x + 6 = \dfrac{84}{4}$
$20x = 84 - 24$	$5x + 6 = 21$
$20x = 60$	$5x = 21 - 6$
$x = 3$	$5x = 15$
	$x = 3$

Blunders (-3)

B1   Correct answer without work. ✍ e.g. $x=3$ stated or substituted.

B2   Error in distributive law and continues,e.g. $20x + 6 = 84$ (once only).

B3   Error in transposition. (each time).

B4   Combines "x's"to "numbers" and continues. e.g.. $20x + 24 = 44x$

B5   Stops at $20x = 60$ or similar.

Slips (-1)

S1   Numerical errors to a max of 3.

S2   Leaves as $\dfrac{60}{20}$ or similar.

Attempts (3 marks)

A1   Any correct step.

A2   Particular case verified for any value of x other than 3.

Worthless (0)

W1   Combines "x's" to "numbers" and stops.

Part (b) (ii)   **5 marks**   **Att 2**

4(b) (ii)   Write in its simplest form

$$3x^2 - 2x + 6 - x(2x - 3)$$

Part (b) (ii)   **5 marks**   **Att 2**

$$3x^2 - 2x + 6 - x(2x - 3)$$

✐ $3x^2 - 2x + 6 - 2x^2 + 3x$

$$x^2 + x + 6$$

Blunders (-3)

B1   Correct answer without work. ✐
B2   Error(s) in distribution.
B3   Combining unlike terms.
B4   Fails to group or groups incorrectly.
B5   Treats as $(3x^2 - 2x + 6 - x)(2x - 3)$ and continues.

Slips (-1)

S1   Numerical errors to a max of 3.

Attempts (2 marks)

A1   Any correct multiplication. e.g. $3x$
A2   Any correct grouping of terms.
A3   A correct step.
A4   Substitutes a value of "x" and continues.

Worthless (0)

W1   Combining unlike terms and stops.
W2   No attempt at distribution but A2 may apply to subsequent work.

4(c) (i)   Liam drove from Town **A** to Town **B**, a distance of *x* km.
          He then drove from Town **B** to Town **C**, a distance of (2*x* + 1) km.
          The total distance that he drove was 56 km.
          Find the value of *x*, correct to the nearest kilometre.

$$x + 2x + 1 = 56$$
$$3x + 1 = 56$$
$$3x = 56 - 1$$
$$3x = 55$$
$$x = \frac{55}{3} \ or \ 18 \cdot 33333 \ or \ 18\frac{1}{3}$$
$$x = 18$$

Blunders (-3)

B1   Correct answer without work. ✍

B2   Error(s) in forming equation for distance travelled.

B3   Error in grouping terms. e.g. $2x + 1 = 56$ and continues.(once only).

B4   Error in transposition.(each time).

B5   Combines "*x*'s"to "numbers". e.g. $4x = 56$ and continues.

B6   Stops at $3x = 55$ or candidate's equivalent. {S2 also applies}

Slips (-1)

S1   Numerical errors to a max of 3.

S2   Leaves as $\frac{55}{3}$ *or* $18 \cdot 333$ *or* $18\frac{1}{3}$ or candidate's equivalent.

Attempts (3 marks)

A1   Any correct step.

A2   Illustrates information on a diagram and stops.

Worthless (0)

W1   Combines "*x*'s" to "numbers" and stops.

W2   Incorrect answer no work e.g. $x = 56$.

Part(c) (ii)   **10 marks**   **Att3**

4(c) (ii)   Solve for x and for y:

$$3x + 5y = 13$$
$$x + 2y = 5$$

.

Part(c) (ii)   **10 marks**   **Att3**

✍   I   II

I:
$$3x + 5y = 13$$
$$\underline{x + 2y = 5}$$
$$6x + 10y = 26$$
$$\underline{-5x - 10y = -25}$$
$$x = 1$$
$$\Rightarrow y = 2$$

or

$$3x + 5y = 13$$
$$\underline{x + 2y = 5}$$
$$3x + 5y = 13$$
$$\underline{-3x - 6y = -15}$$
$$-y = -2$$
$$y = 2$$
$$\Rightarrow x = 1$$

or

II:
$$x = 5 - 2y$$
$$3(5 - 2y) + 5y = 13$$
$$15 - 6y + 5y = 13$$
$$-y = -2$$
$$y = 2$$
$$\Rightarrow x = 1$$

---

*   Apply only **one** blunder deduction (B2 or B3) to any error(s) in establishing the first equation in terms of x only or the first equation in terms of y only.

*   Finding the second variable is subject to a maximum deduction of (3).

Blunders (-3)

B1   Correct answers without work. ✍ e.g. $x=1$, $y=2$. stated or substituted.

B2   Error(s) in establishing the first equation in terms of x only $[\,x = 1\,]$ or the first equation in terms of y only $[\,-y = -2\,]$ through elimination by cancellation.

B3   Error(s) in establishing the first equation in terms of x only $[\,x = 5 - 2y\,]$ or the first equation in terms of y only $[\,5y = 13 - 3x\,]$ through elimination by substitution.

B4   Errors in transposition in solving the first one variable equation.
B5   Errors in transposition when finding the second variable.
B6   Incorrect substitution when finding second variable.
B7   Finds one variable only.

Slips (-1)
S1   Numerical errors to a max of 3

Attempts (3 marks)
A1   Attempt at transposition and stops.
A2   Multiplies either equation by some number and stops.

QUESTION 5

Part (a)	10 marks	Att 3
Part (b)	20(5, 5, 5, 5) marks	Att 8(2, 2, 2, 2)
Part (c)	20(5, 5, 10) marks	Att 7(2, 2, 3)

Part (a)	10 marks	Att 3

5(a)	Find the values of x for which $3x + 2 < 11$, $x \in \mathbf{N}$

Part (a)	10 marks	Att 3

✍

$$3x + 2 < 11$$
$$3x < 11 - 2$$
$$3x < 9$$
$$x < 3$$
$$\{0, 1, 2\}$$

Blunders (-3)

B1   Correct answer without work. ✍
B2   Error in transposition. (each time).
B3   Combining unlike terms.
B4   Mishandles the direction of inequality e.g. $3x > 9$
B5   Treats inequality as equality and continues. {S3 may apply}
B6   Combines "x's" to "numbers". e.g.. $5x < 11$ and continues.
B7 $x < 3$ and stops.

Slips (-1)

S1   Numerical errors to a max of 3.
S2 $<$ taken as $\leq$.
S3   No listing or incorrect listing of values. {Subject to max penalty of 3}.

Misreadings (-1)

M1 $3x + 2 < 1$, and continues.

Attempts (3 marks)

A1   Attempt at transposition and stops.
A2   Particular case verified.

Part (b) (i)	**5 marks**	**Att 2**

5(b) (i)	Factorise:	$16xy + 11y$

$$y(16x + 11)$$

Blunders (-3)

B1   An incorrect factor

B2   Removes factor incorrectly.

Attempts (2 marks)

A1   Indication of common factor. e.g. underline y 's and stops.

Part (b) (ii)	**5 marks**	**Att 2**

5(b) (ii)	Factorise:	$5x + 10y + ax + 2ay$

Part (b) (ii)	**5 marks**	**Att 2**

✍	$5x + 10y + ax + 2ay$ $5(x + 2y) + a(x + 2y)$ $(5 + a)(x + 2y)$	or	$5x + 10y + ax + 2ay$ $x(5 + a) + 2y(5 + a)$ $(x + 2y)(5 + a)$

*   Accept also (with or without brackets) for 5 marks any of the following

$(5 + a)$ and $(x + 2y)$ {The word **and** is written down.}

$(5 + a)$ or $(x + 2y)$ {The word **or** is written down.}

$(5 + a) , (x + 2y)$ {A comma is used}

Blunders (-3)

B1   Correct answer without work. ✍

B2   Stops after first line of correct factorisation. e.g. $.5(x + 2y) + a(x + 2y)$ or equivalent.

B3   Error(s) in factorising any pair of terms.

B4   Incorrect common factor and continues. e.g. $2(ay + 5y) + x(a + 5)$

Slips (-1)

S1 $(5 + a) \pm (x + 2y)$

S2   Correct first line of factorisation but ends as $5a(x + 2y)$.

Attempts (2 marks)

A1   Pairing off, or indication of common factors and stops.

A2   Correctly factorises any pair and stops.

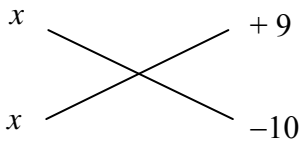|			
5(b) (iii)	Factorise:	$x^2 - x - 90$	

$x^2 - x - 90$ $x^2 + 9x - 10x - 90$ $x(x+9) - 10(x+9)$ $(x-10)(x+9)$	x $+9$ (cross method) x -10 $\Rightarrow (x-10)(x+9)$	$\dfrac{-(-1) \pm \sqrt{(-1)^2 - 4(1)(-90)}}{2(1)}$ $\dfrac{1 \pm \sqrt{1 + 360}}{2} = \dfrac{1 \pm 19}{2}$ $\dfrac{20}{2} = 10 \quad \dfrac{-18}{2} = -9$ $\Rightarrow (x-10)(x+9)$

*   Accept also (with or without brackets) for 5 marks any of the following
      $(x - 10)$ and $(x + 9)$ {The word **and** is written down.}
      $(x - 10)$ or $(x + 9)$ {The word **or** is written down.}
      $(x - 10)$, $(x + 9)$ {A comma is used}

B1   Incorrect two term linear factors of. $x^2 - x - 90$ formed from correct (but inapplicable) factors of x^2 and -90 .e.g $(x - 45)(x + 2)$.

B2   Incorrect factors of x^2.

B3   Incorrect factors of -90.

B4   Correct cross method but factors not shown and stops.

B5 $x(x + 9) - 10(x + 9)$ or similar and stops.

B6   Incorrect common factor and continues.

B7   Incorrect quadratic formula and continues.

B8   Error in quadratic formula. (each time).

B9   Answer left as roots.

B10   Sign error(s) in substituted formula.

B11   Error in square root or square root ignored.

Slips (-1)
S1   Numerical errors to a max of 3.
S2   Uses quadratic equation formula, but has wrong sign in factors.

Attempts (2 marks)
A1   Correct quadratic equation formula quoted and stops
A2   Correct factors of either x^2 or ± 90.
A3   Any correct step.

Worthless (0 marks)
W1 $x^2 - x = 90$ or similar and stops.
W2   Combines "x's" to "numbers" and continues or stops.

Part (b) (iv)   **5 marks**   **Att 2**

5(b)   (iv)   Factorise: $x^2 - 121$

Part (b) (iv)   **5 marks**   **Att 2**

$(x - 11)(x + 11)$

*   Accept also (with or without brackets) for 5 marks any of the following

         $(x - 11)$ and $(x + 11)$ {The word **and** is written down.}

         $(x - 11)$ or $(x + 11)$ {The word **or** is written down.}

         $(x - 11) , (x + 11)$ {A comma is used}

*   Quadratic equation formula method is subject to slips and blunders.

* $\left(x - \sqrt{121}\right)\left(x + \sqrt{121}\right)$ merits 5 marks.

Blunders (-3)

B1   Incorrect two term linear factors of $x^2 - 121$ formed from correct (but inapplicable)

        factors of x^2 and -121.e.g $(x - 121)(x + 1)$.

B2   Incorrect factors of x^2.

B3   Incorrect factors of -121.

B4 $(11 - x)(11 + x)$.

B5 $(x - 121)(x + 121)$.

B6   Answer left as roots.

Slips (-1)

S1 $(x - 11) \pm (x + 11)$

Attempts (2 marks)

A1   Correct factors of x^2 only.

A2   Correct factors of ± 121 only.

A3 x *or* ± 11 appears.

A4 $x^2 - 121 = x.x - 11.11$ and stops.

A5   Mention of the difference of two squares .e.g. { $x^2 - (121)^2$ }

A6   Correct quadratic equation formula quoted and stops.

A7 $\sqrt{121}$

Worthless (0 marks)

W1   Combines "*x*'s" to "numbers" and continues or stops.

Part(c) (i)   **5 marks**   **Att2**

5(c)(i)   Express $\dfrac{2x-1}{5} + \dfrac{x+7}{2}$ as a single fraction.

Give your answer in its simplest form.

Part(c) (i)   **5 marks**   **Att2**

✍

$$\dfrac{2x-1}{5} + \dfrac{x+7}{2}$$

$$\dfrac{2(2x-1) + 5(x+7)}{10}$$

$$\dfrac{4x - 2 + 5x + 35}{10}$$

$$\dfrac{9x + 33}{10}$$

* $\dfrac{2x-1}{5} + \dfrac{x+7}{2} = \dfrac{3x+6}{7}$ Zero marks.

Blunders (-3)

B1   Correct answer without work. ✍
B2   Error(s) in distribution. e.g $2(2x-1) = 4x-1$.
B3   Mathematical error e.g. -2 +35 = -33. 2(-1) = 2.
B4   Incorrect common denominator and continues.

B5   Incorrect numerator from candidate's denominator e.g. $\dfrac{5(2x-1) + 2(x+7)}{10}$.

B6   No simplification of numerator.
B7   Omitting denominator.

Slips (-1)

S1   Drops denominator.
S2   Numerical error to a max of 3.

S3   Answer not in simplest form. e.g. $\dfrac{18x+66}{20}$.

Attempts (2 marks)

A1   10 only or a multiple of 10 only appears.
A2   Any correct step.

Worthless (0)

W1 $\dfrac{x}{5} + \dfrac{8x}{2}$,   or $\left(\dfrac{2x-1}{5}\right)\left(\dfrac{x+7}{2}\right)$ and stops.

Part(c) (ii)	5 marks	Att2

5(c) (ii)   Hence, or otherwise, solve the equation $\dfrac{2x-1}{5} + \dfrac{x+7}{2} = 6$.

Part(c) (ii)	5 marks	Att2

$$\frac{9x + 33}{10} = 6$$

$$9x + 33 = 60$$

$$9x = 60 - 33$$

$$9x = 27$$

$$x = 3$$

*   Accept candidates answer from previous work.

Blunders (-3)

B1   Correct answer without work. ✍

B2   Error in transposition. (each time)

Slips (-1)

S1   Numerical error to a max of 3.

S2   Leaves as $\dfrac{27}{9}$.

Attempts (2 marks)

A1   Answer from (c) (i) written in this part or worked again in this part.

A2   Any correct step and stops.

A3   Particular case verified.

5(c) (iii)   Solve the equation: $x^2 + 5x - 36 = 0$.

Part(c) (iii)   **10 marks**   **Att3**

$x^2 + 5x - 36 = 0$ $x^2 + 9x - 4x - 36 = 0$ $x(x+9) - 4(x+9) = 0$ $(x+9)(x-4) = 0$ $\Rightarrow x = -9 \quad x = 4$	x $+9$ x -4 $(x+9)(x-4)$ $\Rightarrow x = -9$ $x = 4$	$\dfrac{-(5) \pm \sqrt{(5)^2 - 4(1)(-36)}}{2(1)}$ $\dfrac{-5 \pm \sqrt{25 + 144}}{2} = \dfrac{-5 \pm \sqrt{169}}{2} = \dfrac{-5 \pm 13}{2}$ $\dfrac{8}{2} = 4 \quad \dfrac{-18}{2} = -9$

Blunders (-3)

B1   Correct answers without work. ✍ e.g. $x = 4$, $x = -9$ stated or substituted.

B2   Incorrect two term linear factors of $x^2 + 5x - 36$ formed from correct (but inapplicable) factors of x^2 and -36. e.g. $(x - 12)(x + 3)$

B3   Incorrect factors of x^2.

B4   Incorrect factors of -36.

B5   Correct cross method and factors not shown and stops. {B8 also applies}

B6 $x(x+9) - 4(x+9)$ or similar and stops. {Note: B8 also applies }.

B7   Incorrect root(s) from factors.

B8   No roots given.

B9   One root only

B10 Error in quadratic formula. (each time).

Slips (-1)

S1   Numerical errors to a max of 3.

S2   Leaves as $\dfrac{p}{q}$.

Attempts (3 marks)

A1   Correct factors of x^2 only

A2   Correct factors of ± 36 only.

A3   Some effort at factorisation.

A4   Correct quadratic equation formula quoted and stops

A5   Any correct step.

Worthless (0)

W1   Combines unlike terms and continues or stops.

QUESTION 6

Part (a)	10(5, 5) marks	Att 4(2, 2)
Part (b)	25(15, 10) marks	Att 8(5, 3)
Part (c)	15(5, 5, 5) marks	Att 6(2, 2, 2)

Part(a)	10(5,5) marks	Att 4(2,2)

6(a) $P = \{(1,3)\ (4,6)\ (5,8)\ (7,9)\}$
Write out the domain and range of P.

Part(a) Domain	5 marks	Att 2

Domain   =   {1, 4, 5, 7}

Slips (-1)
S1   Each correct element omitted and/or each incorrect element included. {See M1}

Misreadings (-1)
M1   Correct range. i.e. { 3,6,8,9}given.

Attempts (2 marks)
A1   One element of domain.
A2   Domain $\{1 \rightarrow 7\}$

Worthless (0)
W1   No element of the domain appears. {See M1}

Part(a) Range	5 marks	Att 2

Range   =   {3, 6, 8, 9}

Slips (-1)
S1   Each correct element omitted and/or each incorrect element included. {See M1}

Misreadings (-1)
M1   Correct domain. i.e. {1, 4, 5, 7} given.

Attempts (2 marks)
A1   One element of range.
A2   Range$\{3 \rightarrow 9\}$

Worthless (0)
W1   No element of the range appears. {See M1}

Part (b)   **25(15, 10) marks**   **Att 8(5, 3)**

6(b)	Draw the graph of the function

$$f : x \rightarrow 2 + 3x - x^2$$

in the domain $-1 \leq x \leq 4,$ where $x \in \mathbf{R}$

Part (b) Table   **15 marks**   **Att 5**

✍

$f(-1) = 2 + 3(-1) - (-1)^2 =$ **-2**

$f(0) = 2 + 3(0) - (0)^2 =$ **2**

$f(1) = 2 + 3(1) - (1)^2 =$ **4**

$f(2) = 2 + 3(2) - (2)^2 =$ **4**

$f(3) = 2 + 3(3) - (3)^2 =$ **2**

$f(4) = 2 + 3(4) - (4)^2 =$ **-2**

x	-1	0	1	2	3	4
2	2	2	2	2	2	2
$+3x$	-3	0	3	6	9	12
$-x^2$	-1	0	-1	-4	-9	-16
$f(x)$	-2	2	4	4	2	-2

*   Error(s) in each row /column attract a maximum deduction of 3.

Blunders (-3)
B1   Treats $-x^2$ taken as x^2 and places "x^2" in the table or function..
B2 $-x^2$ taken as $-2x$ all the way. [In row headed $-x^2$ by candidate]
B3 $+3x$ taken as $+3$ all the way. [In row headed $+3x$ by candidate]
B4   2 calculated as $2x$ all the way.[In row headed 2 by candidate]
B5   Adds in top row when evaluating $f(x)$.
B6   Omits "2" row or omits "3 x" row.
B7   Omits a value in the domain (each time).
B8   Each incorrect image without work.

Slips (-1)
S1   Numerical errors to a max of 3 in any row / column.

Misreadings (-1)
M1   Misreads "$+3x$" as "-3 x" and places "-3 x" in the table or function
M2   Misreads "2"as "-2" and places "-2" in the table or function.

Attempts (5 marks)
A1   Omits $-x^2$ row from table or treats $-x^2$ as $\pm x$.
A2   Any effort at calculating point(s).
A3   Only one point calculated and stops.

Part (b) Graph   **10 marks**   **Att 3**
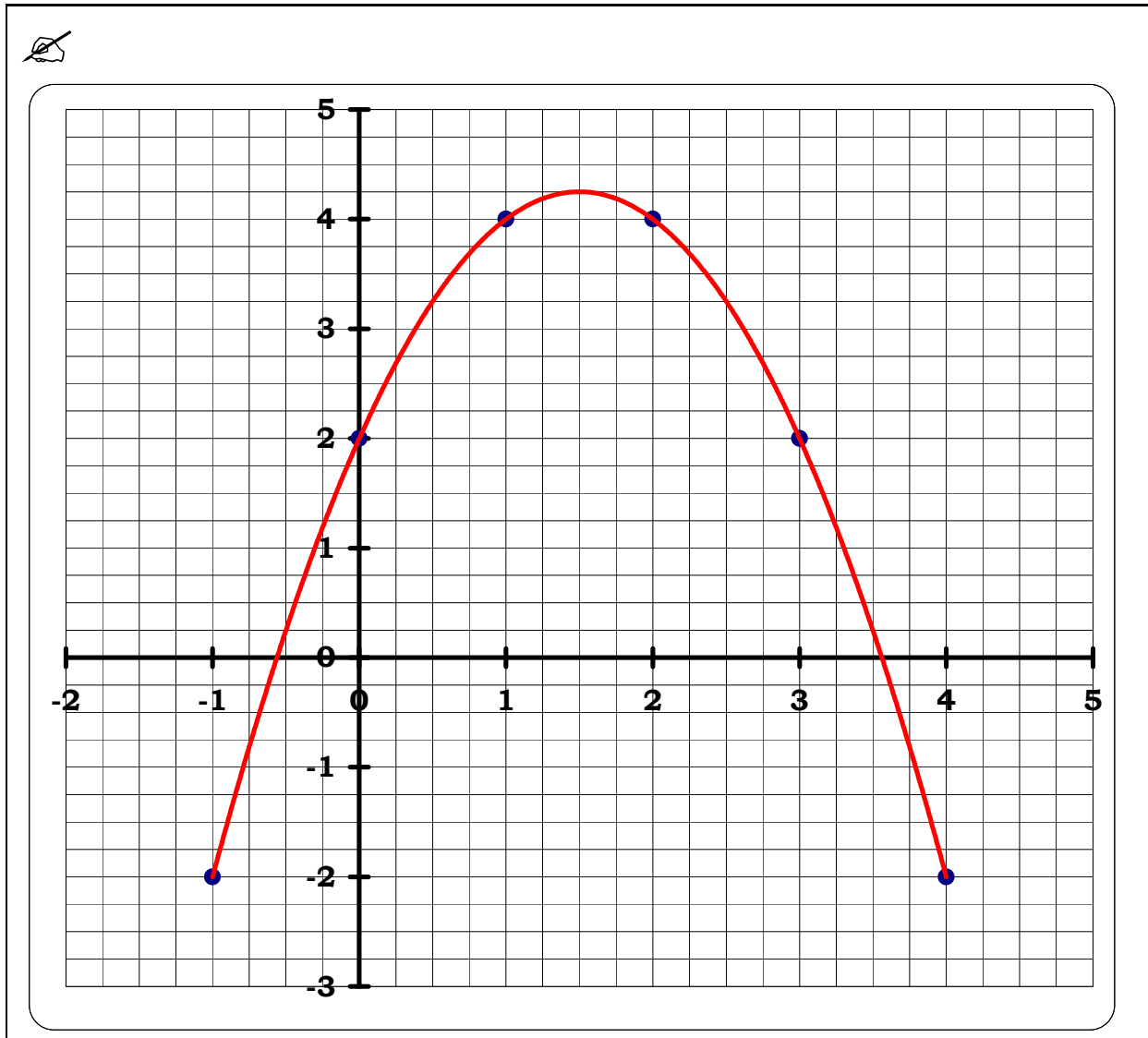
*   Accept candidate's values from previous work.
*   Only **one** correct point **graphed correctly** $\Rightarrow$ Att <u>5</u> + Att <u>3</u>
*   **Correct graph but no table** $\Rightarrow$ full marks i.e. **(15+10)** marks.
*   Accept reversed co-ordinates if
    (i)   if axes not labelled or (ii) if axes are reversed to compensate (see B1 below)

Blunders (-3)
B1   Reversed co-ordinates plotted against non-reversed axes (once only) {See 4th * above}.
B2   Scale error (once only).
B3   Points not joined or joined in incorrect order (once only).

Slips (-1)
S1   Each point of candidate graphed incorrectly. {Tolerance $\pm\, 0.25$ }
S2   Each point from table not graphed [See 2nd * above].

Attempts (3 marks)
A1   Graduated axes (need not be labelled).

Part(c) (i)   **5 marks**   **Att 2**

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

x	0	1	2	3
y	1	2	3	4

*　　Accept candidate's values without work.

Slips(-1)
S1　　Each y value omitted or incorrect.

Attempts(2marks)
A1　　Any one correct value of y .
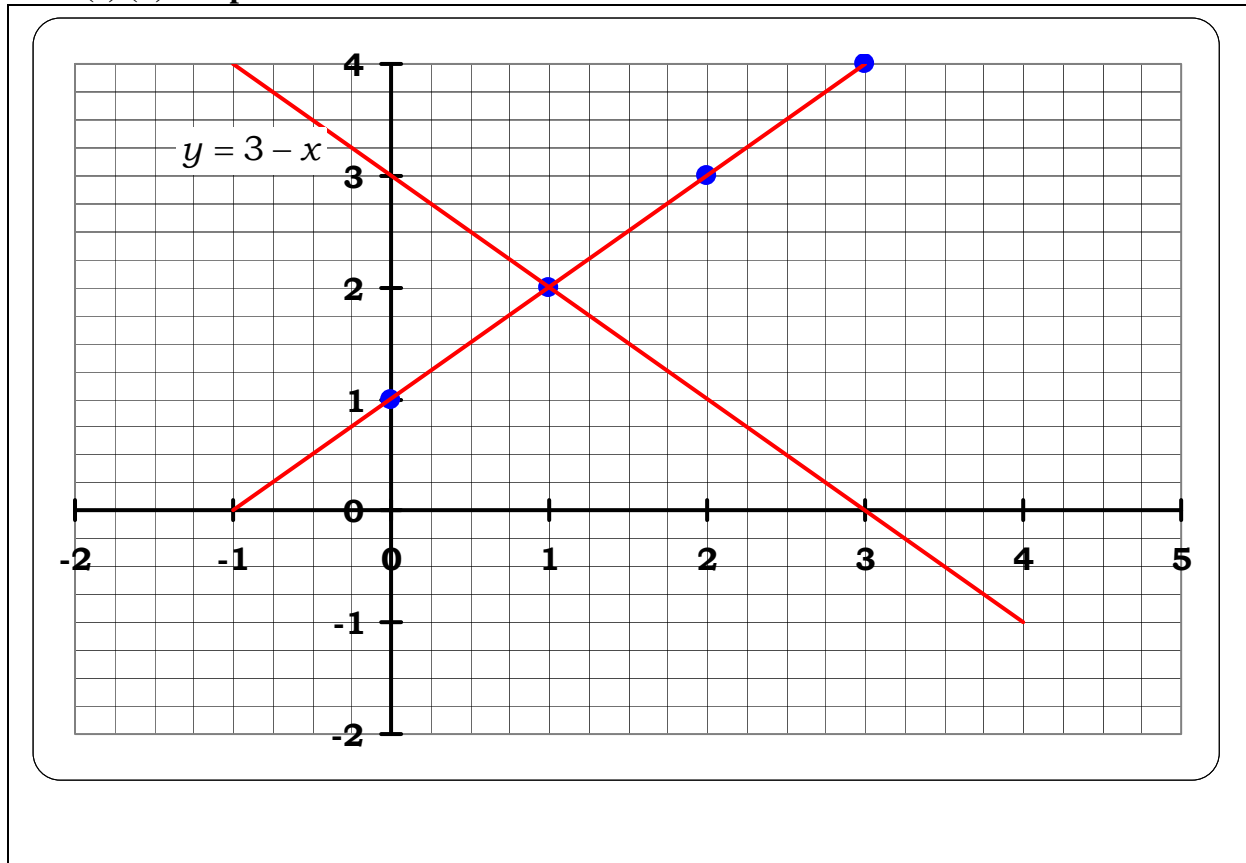A2　　Any effort at calculating point where work is shown.

Part(c) (ii)   **5 marks**   **Att 2**

6(c) (ii)	On the grid below, the graph of the line $y = 3 - x$ is drawn.
	Using your answers from **(i)**, draw the graph of $y = x + 1$ on the same grid

Part(c) (ii) Graph   **5 marks**   **Att 2**

*   Accept candidate's values from previous work.

*   Only **one** point **listed and <u>graphed correctly</u>** $\Rightarrow$ Att 2 + Att 2

Blunders (-3)

B1   Reversed co-ordinates (y , x) plotted.

B2   Points not joined or joined in incorrect order.

Slips (-1)

S1   Each point of candidate graphed incorrectly. {See B1}

S2   Each point from table not graphed or not contained on the candidate's graph.

Attempts (2 marks)

A1   Any straight line drawn.

Part(c)(iii) Intersection **5 marks** **Att2**

6(c)(iii)	<u>Use the graphs drawn in **6 (c) (ii)**</u> to write down the coordinates of the point of intersection of the two lines $y = 3 - x$ and $y = x + 1$.

Part(c)(iii) Intersection **5 marks** **Att2**

✍ Point of intersection = (1,2)

* Accept previous graph from c (ii).

Blunders(-3)

B1 Answer not presented in designated box.

B2 Answer beyond tolerance. {Tolerance ± 0.25 }.

Attempts(2marks)

A1 Indicates correctly either $x \ or \ y$ co-ordinate of point of intersection.

A2 Point of intersection indicated.

A3 Algebraic evaluation.

Worthless(0)

W1 Answers outside of tolerance without graphical indication.