



Coimisiún na Scrúduithe Stáit State Examinations Commission

MARKING SCHEME

JUNIOR CERTIFICATE EXAMINATION 2004 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.

QUESTION 1

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

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

(a) (i) $75 + 52$

(ii) $75 - 52$

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

(i) 127

Blunders (-3)

B1 Uses incorrect operator

Slips (-1)

S1 Error in calculation (once only)

S2 Decimal error

Misreadings (-1)

M1 Error in copying down a digit

Attempts (2 marks)

A1 Any attempt at addition

Worthless (0)

W1 Incorrect answer with no work

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

(a) (ii) 23

* If answers to (i) and (ii) interchanged, blunder *once only*.

Blunders (-3)

B1 Uses incorrect operator

Slips (-1)

S1 Error in calculation (once only)

S2 Decimal error

Misreadings (-1)

M1 Error in copying down a digit

Attempts (2 marks)

A1 Any attempt at subtraction

Worthless (0)

W1 Incorrect answer with no work

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

- | | |
|--------------|-------------------|
| (i) | $468 \div 6 =$ |
| (ii) | $2314 \times 5 =$ |
| (iii) | $\sqrt{49} =$ |
| (iv) | 4^3 |

b(i)	5marks	Att 2
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(b) (i)	78
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Blunders (-3)

B1 Incorrect operator (with work)

Slips (-1)

S1 Calculation error

S2 Decimal error

Attempts (2 marks)

A1 Any attempt at division A2 0.01234....(6÷468)

Worthless (0)

W1 Incorrect answer with no work, subject to A2

(b)(ii)	5 marks	Att2
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(b)(ii)	11570
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Blunders (-3)

B1 Incorrect operator (with work)

Slips (-1)

S1 Calculation error

S2 Decimal error

Attempts (2 marks)

A1 Any attempt at multiplication.

Worthless (0)

W1 Incorrect answer with no work.

(b)(iii)	5 marks	Att2
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(b)(iii)	7
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*Blunders (-3)*B1 $49^2 (= 2401)$ with/without work*Attempts (2 marks)*A1 $49^{1/2}$ written A2 24.5 with/without work*Worthless (0)*

W1 Incorrect answer without work

(b)(iv)	5marks	Att2
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(b)(iv)	64
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*Blunders (-3)*B1 $4 \times 3 = 12$ or 12 with/without work.*Slips (-1)*S1 $4 \times 4 \times 4$ and stops.

S2 Calculation error

*Attempts (2 marks)*A1 4×3 and stops

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

- | | |
|--|-------------------|
| (i) Write down the nearest whole number to $7 \cdot 8$. | Answer _____ |
| (ii) Write down the nearest whole number to $12 \cdot 3$. | Answer _____ |
| (iii) Use your answers to estimate the value of $7 \cdot 8 \times 12 \cdot 3$. | Estimate _____ |
| (iv) Find the exact value of $7 \cdot 8 \times 12 \cdot 3$. | Exact value _____ |

(c)(i)(ii)**5,5marks****Att 2,2**

- | | |
|---------|----|
| (c)(i) | 8 |
| (c)(ii) | 12 |

*Blunders (-3)*B1 Selects any incorrect whole number, other than those listed below.*Slips (-1)*

S1 (i) 7 (ii) 13

S2 (i) 80 (ii) 120

Worthless (0)

W1 Rewrites (i) 7.8 (ii) 12.3

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

- | | |
|----------|----|
| (c)(iii) | 96 |
|----------|----|

*Accept candidate's answers from previous parts.

*Accept 96 without work even if (i) and/or (ii) is incorrect.

*If correct answers to (i) and/or (ii) are identified in this part, award full marks retrospectively to both/either parts.

Blunders (-3)

B1 Incorrect operator, with work.

*Attempts (2 marks)*A1 95.94 with/without work subject to 1st ***(c)(iv)****5 marks****Att2**

- | | |
|---------|-------|
| (c)(iv) | 95.94 |
|---------|-------|

*If same incorrect operator used, with work, as in (iii) don't penalise again.

Blunders (-3)

B1 Incorrect operator, with work.

Slips (-1)

S1 Decimal error

S2 Error in calculation.

Attempts (2 marks)

A1 Any attempt at multiplication.

QUESTION 2

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

 (a) A “take-away” meal costs €6.80.
I pay with a €10 note. How much change do I get?



(a) 10 marks Att (3)

 (a) $10 - 6.80 = €3.20$

* Accept 320 (cent)

Blunders (-3)

B1 Correct answer with no work shown.

B2 Addition instead of subtraction

B3 $10 - 6.80$ and stops

Slips (-1)

S1 Arithmetic error

S2 Misplaced decimal

Attempts (3 marks)

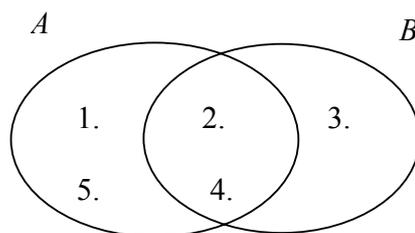
A1 Correct digits but incorrect decimal location, with no work shown.

Worthless (0)

W1 6.70 or any other incorrect answer with no work

Case: $6.80 - 10 = 3.20$ (or 320) : 10 marks
but $6.80 - 10 = 6.70$ (B + S) : 6 marks

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



(i) $A = \{ \quad , \quad , \quad , \quad \}$

(ii) $B = \{ \quad , \quad , \quad \}$

(iii) $A \cap B = \{ \quad , \quad \}$

(iv) $A \cup B = \{ \quad , \quad , \quad , \quad , \quad \}$

b(i)(ii)(iii)(iv) **20(5,5,5,5) marks** **Att (2,2,2,2)**

b(i)	{1, 2, 5, 4}
b(ii)	{2, 3, 4 }
(b)(iii)	{2, 4}
(b) (iv)	{1, 2, 3, 4, 5 }

*Accept appropriate shading, but answers must be distinguishable.

Slips (-1)

S1 Each incorrect or blank entry to max -3 for each part, assuming at least one (correct) entry
Attempts (2 marks)

A1 Incorrect entry/entries only in a given part.

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

(c) An electricity bill gives the following details:

	Present Reading	Previous Reading
Units	36 551	35 751

Find

- ~~✍~~ (i) the number of units used
- ~~✍~~ (ii) the cost of the electricity used if each unit costs 10.75 cent
- ~~✍~~ (iii) the total cost when VAT at 13.5% is added to the cost of the electricity used.

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

✍ (c) (i)	$36551 - 35751 = 800$
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Blunders (-3)

B1 Adds instead of subtracts

B2 Mathematical error in subtraction e.g. $35751 - 36551 = 1200$, say

B3 Correct answer with no work

Slips (-1)

S1 Arithmetic error

S2 Decimal error

Attempts (3 marks)

A1 72302 *without work*

A2 36551 or 35751

Worthless (0)

W1 Any other incorrect answer without work.

c(ii)

5marks

Att 2

 (c) (ii)	$800 \times 10.75 = 8600$ or 86.00
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* Accept candidate's answer from (i)

Blunders (-3)

B1 $800 \div 10.75$ and continues

B2 $10.75 \div 800$ and continues

Slips (-1)

S1 Calculations incomplete.

S2 Error in calculations

S3 Decimal error

S4 $10.75 \times$ number other than ans (i) and continues.

S5 Correct answer with no work.

Attempts (2marks)

A1 10.75 or ans (i) written and stops.

Worthless (0)

W1 Incorrect answer with no work.

(c) (iii)

5 marks

Att 2

 (c) (iii)	$86 \times 1.135 = 97.61$ or $86 \times 13.5 \div 100 = 11.61 \Rightarrow 86 + 11.61 = 97.61$
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* Accept candidate's answers from previous parts.

* Accept work/answer in cent

Blunders (-3)

B1 Divides by 13.5

B2 Uses 800 or 10.75 and continues

B3 Fails to add 11.61.

Slips (-1)

S1 86×1.135 and stops

S2 Decimal error

S3 Rounds off too soon

S4 No division by 100

S5 Correct answer with no work shown

Attempts (2 marks)

A1 1.135 and stops

A2 Some effort at %.

Worthless (0)

W1 Incorrect answer with no work shown.

QUESTION 3

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

(a) Write down the mode of the following numbers
6, 5, 7, 6, 6, 4, 3.

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

(a) 6

*Accept answer indicated

Blunders (-3)

B1 Frequency table constructed

Attempts (3 marks)

A1 3 written

A2 Tries to find mean, with work

A3 Numbers rearranged in ascending/descending order

Worthless (0)

W1 Incorrect answer with no work.

Part (b)

20marks

Att 6

The pupils in a class were asked what their favourite fruit was.
The table shows the results.

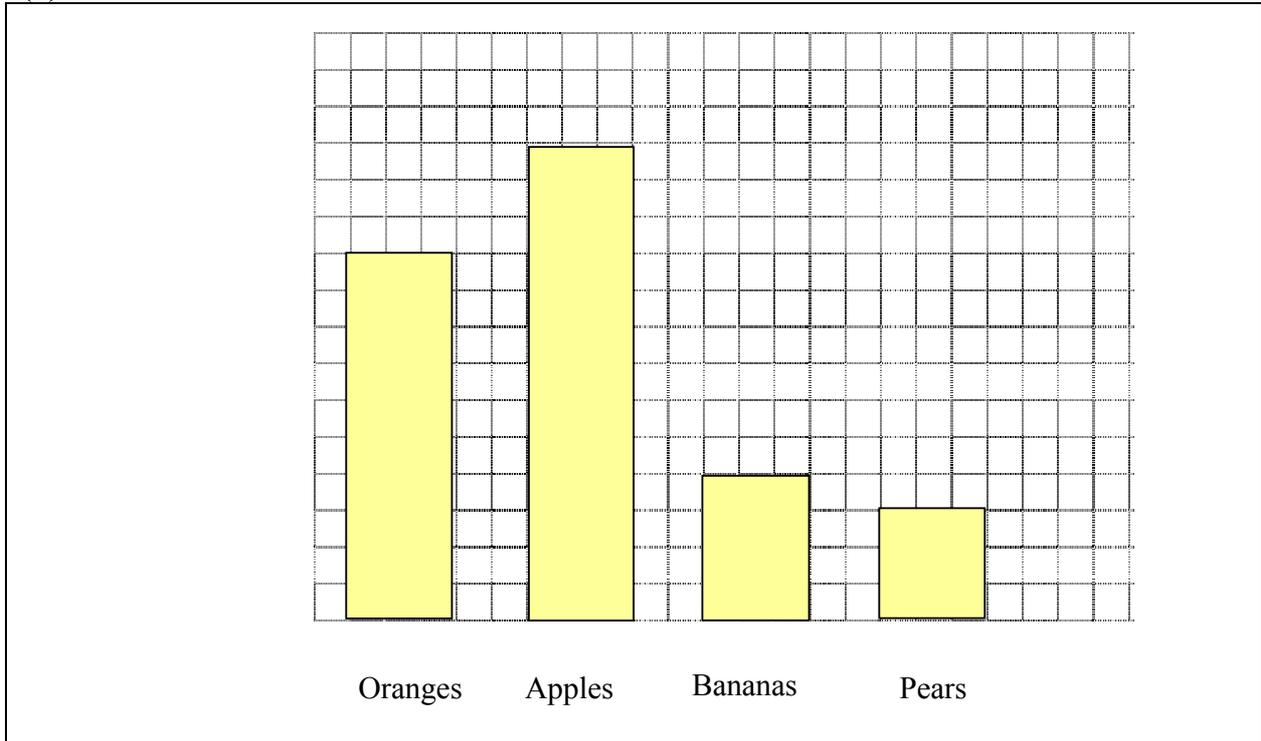
Favourite Fruit	Oranges	Apples	Bananas	Pears
Number of pupils	10	13	4	3

Draw a bar chart to represent the results.
Use the grid to draw your bar chart.

(b)

20 marks

Att 6



* Tolerance: ± 1 box on grid (to the eye)

* Vertical or horizontal bars accepted

* Order of bars not important if they are in the correct ratio.

* 5 marks for each correctly drawn bar (**N.B. Att 6 marks**)

Blunders (-3)

B1 Scale error (each bar)

B2 Trend graph drawn

B3 Bars not distinct

Attempts (6 marks)

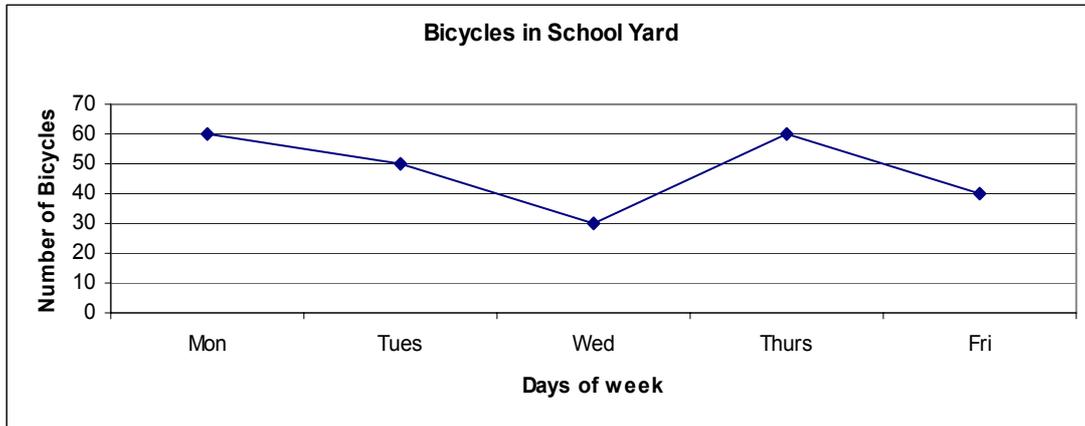
A1 Pie-Chart

Part (c)

20(5,10,5) marks

Att (2,3,2)

- (c) The number of bicycles in a school yard during one week (Monday to Friday) is shown in the trend graph below.



- (i) How many bicycles were in the school yard on Wednesday?
(ii) What was the total number of bicycles in the school yard during the week?
(iii) What percentage of the total numbers of bicycles was in the school yard on Wednesday?

(c)(i)

5 marks

Att 2

(c)(i)

30

Misreadings (-1)

M1 Chooses wrong day (60, 50 40)

Attempts (2 marks)

A1 Selects more than one of 60, 50, 40, 30

Worthless (0)

W1 Any other incorrect number.

(c)(ii)

10marks

Att 3



(c)(ii)

$$60 + 50 + 30 + 60 + 40 = 240$$

Blunders (-3)

B1 Correct answer with no work shown

Slips (-1)

S1 Calculation error

S2 Calculation not complete

S3 Each incorrect, omitted or additional number (to max -3)

Attempts (3 marks)

A1 Identifies any of the relevant numbers (see Case)

Worthless (0)

W1 Incorrect answer with no work.

Case: 60 50 30 60 40 and stops: (B + S).

Award 6 marks

(c)(iii)

5 marks

Att 2

	(c)(iii)	$\frac{30}{240} \times 100 = 12.5\%$	or	$\frac{30}{240} = \frac{1}{8} = 12.5\%$
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* % symbol not required

* Accept candidate's figures from previous parts.

Blunders (-3)

B1 No relevant fraction formed

B2 Incorrect numerator

B3 Incorrect denominator

Slips (-1)

S1 Arithmetic error in calculations

S2 No multiplication by 100

S3 Divides by 100

S4 Calculations not complete

S5 Correct answer with no work

Attempts (2 marks)

A1 Some effort at %

A2 Correct digits, but incorrect decimal placement, with no work

A3 8 without work

Worthless (0)

W1 Incorrect answer with no work, subject to A2/A3

Case:

$\frac{240}{30} \times 100$ and continues correctly 1B(-3)
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QUESTION 4

Part(a)	10 marks	Att 3
Part(b)	20 marks	Att 7
Part(c)	20 marks	Att 6
Part (a)	10 marks	Att 3

- (a) A bus leaves Dublin at 10:05 and arrives in Athlone at 12:40.
How long does the journey take?

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

~~✍~~ (a) 12:40 - 10:05 = 2h 35mins

Blunders (-3)

B1 1hr = 100mins

B2 Adds (22:45)

B3 Correct answer with no work

B4 12.40 – 10.05 and stops

Slips (-1)

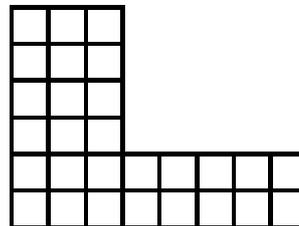
S1 Numerical error

Worthless (0)

Incorrect answer with no work.

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

- (b)
The plan of a garden is shown below.
The area of each box is 4 m².



- (i) How many boxes are there?
- (ii) Calculate the area of the garden in m².
- (iii) Flowers are planted in three quarters of the garden.
Find the area of the garden planted with flowers.

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

(b) (i) 28 boxes *or* $6 \times 3 + 5 \times 2 = 28$ *or* $6 \times 8 - 4 \times 5 = 28$

Blunders (-3)

B1 No addition/subtraction (method 2or3)

Slips (-1)

S1 ± 2 of correct answer with no work.

S2 Arithmetic error

Attempts (3 marks)

A1 Any use of 3, 4, 5, 6 or 8 or any indication of counting the boxes.

Case: One relevant area calculated
e.g. $2 \times 8 = 16$; (2×B) : 4 marks

(b)(ii)

5marks

Att 2



(b) (ii)

$28 \times 4 = 112$

or

$6 \times 12 + 10 \times 4 = 72 + 40 = 112$ or equivalent

*Accept candidate's answer from (i)

Blunders (-3)

B1 $28 \div 4$

Slips (-1)

S1 Incomplete calculations

S2 Numerical error

S3 Decimal error

S4 Correct answer with no work

Attempts (2 marks)

A1 $4 \div 28$

A2 Any effort at adding $4 + 4 + 4 \dots$ or $28 + 28 \dots$

A3 28 or 4 rewritten

Worthless (0)

W1 Incorrect answer with no work

(b)(iii)

5 marks

Att 2



(b)(iii)

$\frac{112 \times 3}{4} = 84$

or

$28 \times 3 = 84$

or

$\frac{28 \times 3}{4} = 21 \text{ boxes} \Rightarrow 21 \times 4 = 84$

or equivalent

* Accept candidate's answers from previous parts.

Blunders (-3)

B1 Fraction inverted ($\frac{4}{3}$)

B2 Divides by 112

Slips (-1)

S1 Incomplete calculations

S2 Numerical error

S3 Correct answer with no work.

Attempts (2 marks)

A1 $\frac{3}{4}$ or 0.75 or equivalent written

A2 Ans (i) or ans (ii) written for this part.

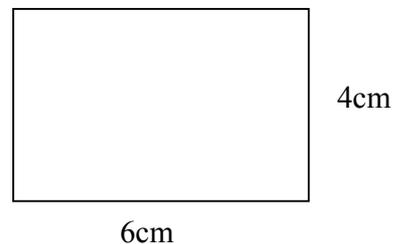
Part (c)

20(10,10) marks

Att (3,3)



(c) (i) A rectangle measures 6 cm by 4 cm.
Find the perimeter of the rectangle.



(ii) The radius of a cylinder is 6 cm and its height is 10 cm.
Calculate the volume of the cylinder, taking $\pi = 3.142$.

(c) (i)

10 marks

Att 3

 (c) (i) $2(6+4) = 20$ or $6 + 6 + 4 + 4 = 20$

Blunders (-3)

B1 Gets area: $6 \times 4 = 24$

B2 $6 \times 6 \times 4 \times 4 = 576$

B3 Correct answer with no work

Slips (-1)

S1 Numerical error

S2 Each side omitted / each additional side included in the addition.

S3 Incomplete calculations

Attempts (3 marks)

A1 6, 4, 10, 24 or 576 without work

Worthless (0)

W1 Incorrect answer without work, subject to A1

(c) (ii)

10 marks

Att 3

 (c)(ii) $V = \pi r^2 h = 3 \cdot 142 \times 6^2 \times 10 = 1131 \cdot 12$
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* No penalty for using π button on calculator.(1130.97.....)

* If other variations of π used then (S (-1)) i.e.

1130·something or 1131·something (other than correct answer) *with work* 9 marks

1130·something or 1131·something (other than correct answer) *without work* 6 marks

Blunders (-3)

B1 Incorrect relevant formula

B2 Correct answer with no work shown

B3 Incorrect substitution (once only)

B4 Mathematical error e.g. $6^2 = 12$ *each time*

Slips (-1)

S1 Numerical errors (once only)

S2 Misplaced decimal

S3 Calculations not complete

Attempts (3 marks)

A1 π not used

A2 Correctly labelled diagram

A3 Correct formula written and stops.

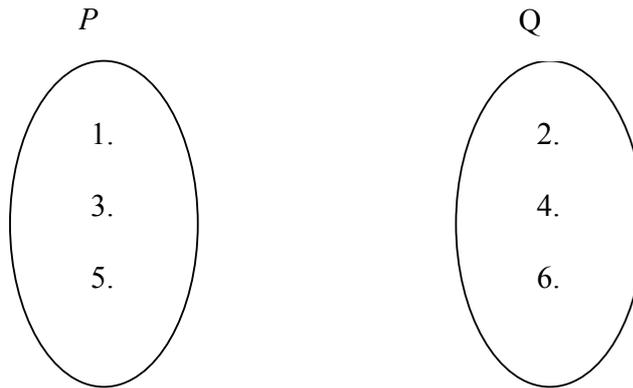
Worthless (0)

W1 Incorrect answer without work other than *

QUESTION 5

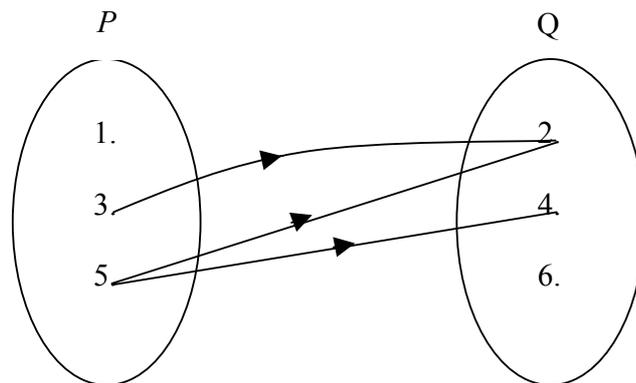
Part (a)	10 marks	Att 3
Part (b)	20 marks	Att 6
Part(c)	20 marks	Att 6
Part(a)	10 marks	Att 3

(a) Draw arrows from P to Q to show the relation “is greater than”.



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

(a)



*Accept couples written

Case 1: 3 lines or less drawn

3 correct:	10 marks
2 correct and 1 incorrect/omitted:	7m
1 correct and 2 incorrect/omitted:	4 m
All incorrect	Attempt 3 m

Case 2: More than 3 lines drawn

3 correct, rest incorrect	7marks
2 correct, rest incorrect	4 marks
1 or none correct	Attempt 3 marks.

Attempts (3 marks)

A1 Any link drawn from set P to set Q

Part(b)

20(10,10) marks

Att (3,3)

(b)



(i)

Given that $y = x + 5$, complete the table below:

x	1	2	3	4
y		7		

(ii) Using your answers from (i) draw the graph of $y = x + 5$ from $x = 1$ to $x = 4$

(b) (i)

10 marks

Att 3



(b)(i)

$$1 + 5 = 6$$

$$3 + 5 = 8$$

$$4 + 5 = 9$$

x	1	2	3	4
y	6	[7]	8	9

*Answers need not be written in table

Blunders (-3)

B1 Transposition error (once only)

B2 $5x$ (unless an obvious misreading)

B3 Correct answer with no work

Slips (-1)

S1 Calculation error (once only if consistent)

S2 Adds in top line

Misreadings (-1)

M1 Error in copying down question

Attempts (3 marks)

A1 1 or 2 correct entries with no work.

A2 Table completed with spurious numbers

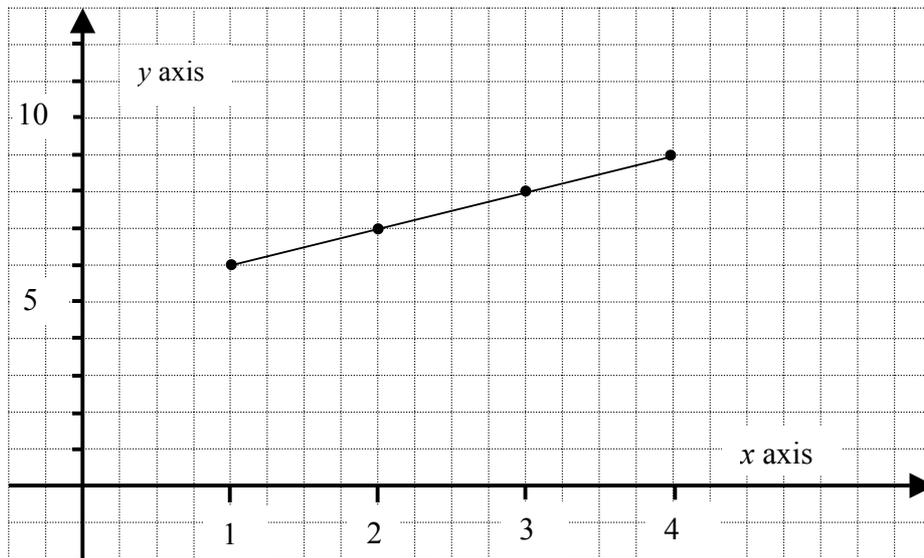
(b) (ii)

10 marks

Att 3



(b) (ii)



* Accept candidate's figures from (i)

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

* If 4 correct points are correctly plotted and no marks were awarded for (i), award att 3 marks retrospectively for (i)

Blunders (-3)

B1 Scale error if different graph/ squared paper used(once)

Slips (-1)

S1 Each incorrectly plotted point, subject to S2, or each omitted point.

S2 (y,x) consistently drawn, penalise once only.

S3 All points not joined.

Attempts (3 marks)

A1 Random (straight) line drawn

Part (c)

20(10,10) marks

Att6(3,3)

(c) (i) Find the value of $x^2 + 4x + 2$ when $x = 3$.

(ii) Solve for x:

$$3(x - 4) = 9$$

(c) (i)

10 marks

Att3

~~✍~~ (c) (i) $(3)^2 + 4(3) + 2 = 9 + 12 + 2 = 23$

Blunders (-3)

B1 Mathematical error e.g. $3^2 = 6$, $4(3) = 4 + 3$ or 43 *each time*

B2 Distributive error (once)

B3 Correct answer with no work shown.

Slips (-1)

S1 Arithmetic errors (once)

S2 Calculations not complete.

Misreadings (-1)

M1 Error in taking down question, if not oversimplified.

Attempts (3 marks)

A1 Any correct step

Worthless (0)

W1 Incorrect answer with no work.

(c) (ii)

10 marks

Att 3

~~✍~~ (c) (ii) $3x - 12 = 9 \Rightarrow 3x = 9 + 12 = 21 \Rightarrow x = \frac{21}{3} = 7$

. or $x - 4 = \frac{9}{3} = 3 \Rightarrow x = 3 + 4 = 7$

*Accept successful T+E, but work must be shown.

Blunders (-3)

B1 Correct answer with no work

B2 Distributive error

B3 Transposition error *each time*

B4 Ignores 3 and continues

Slips (-1)

S1 Calculations not complete.

Attempts (3 marks)

A1 Unsuccessful T+E

A2 Any correct step e.g. $3x$

QUESTION 6

Part (a)	10 marks	Att 3
Part (b)	20 marks	Att 6
Part (c)	20 marks	Att 7
Part(a)	10 marks	Att 3

(a)

$x =$

(a)	10 marks	Att 3
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(a) $50 + 70 = 120$ $180 - 120 = 60$

Blunders (-3)

B1 Correct answer with no work shown.

B2 $360 - 120$ and continues

B3 $70 + 50 = 120$ and stops.

Case: 180 written: Award 4 marks

Slips (-1)

S1 Calculation error

Attempts (3 marks)

A1 Measures angle. Gives answer 60 ± 5 (excluding 60 itself)

A2 120, with no work.

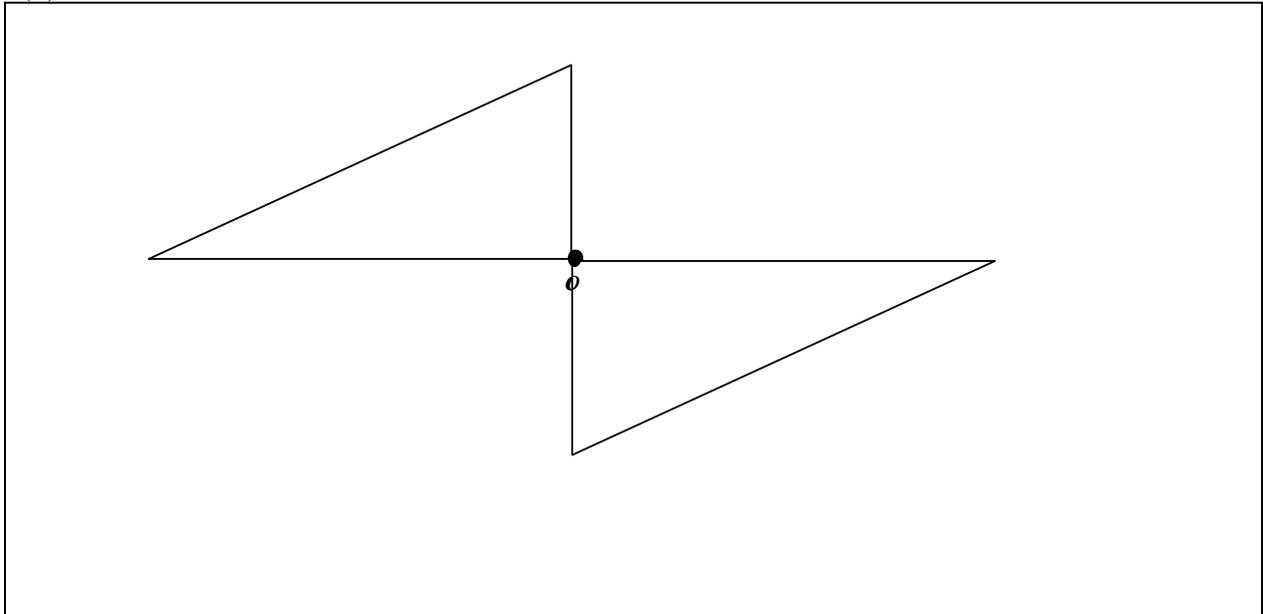
(b)	20 marks	Att 6
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(b) Construct the image of the triangle under the central symmetry in the point o.

(b)

20 marks

Att 6



* Tolerance $\pm 0.5\text{cm}$ (to the eye)

Blunders (-3)

- B1 Vertices located but not joined.
- B2 o not mapped onto o (within tolerance) other than when B3 applies
- B3 Central symmetry but centre of symmetry not at o .
- B4 One inversion missing
- B5 2nd inversion missing

Attempts (6 marks)

- A1 Any triangle drawn
- A2 Any effort at locating an image

Part (c)

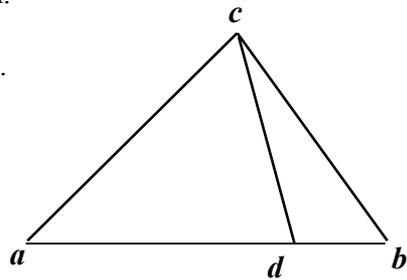
20(10,10)

Att (3,3)

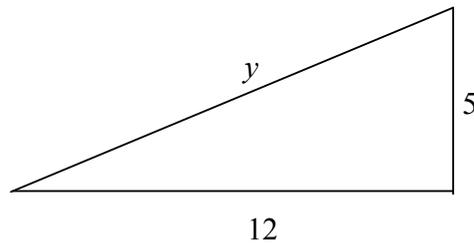
- (c) (i) There are three different triangles in the diagram.
One triangle is cad .
Write down the names of the other two triangles.

Answer _____

Answer _____



- ~~(ii)~~ (ii) Use the Theorem of Pythagoras to find the length of the side marked y in the right-angled triangle.



(c)(i)

10marks

Att 3

(c) (i)

cab
 cdb

Blunders (-3)

B1 One answer incorrect or omitted.

Slips (-1)

S1 Triangle clearly identified but not written (each time)

Attempts (3marks)

A1 cad (in any order)

(c) (ii)

10marks

Att 3

~~(ii)~~ (ii) $y^2 = 5^2 + 12^2 = 25 + 144 = 169$; $y = \sqrt{169} = 13$

Blunders (-3)

B1 Correct answer with no work shown

B2 Mathematical error in squaring (once) e.g. $5^2 = 10$

B3 Fails to get $\sqrt{\quad}$ B4 Mathematical error in getting $\sqrt{\quad}$

Slips (-1)

S1 Arithmetic slip

Attempts (3 marks)

A1 $5 + 12 = 17$

A2 Measures length: 6.5 ± 0.5 cm ($2^3/8$ to $2^6/8$ in).

A3 One or more squares drawn on sides

A4 y^2 or 5^2 or 12^2 and stops

Worthless (0)

W1 Incorrect answer with no work.