Coimisiún na Scrúduithe Stáit
State Examinations Commission

JUNIOR CERTIFICATE EXAMINATION 2006
MATHEMATICS - FOUNDATION LEVEL
MARKING SCHEME
GENERAL GUIDELINES FOR EXAMINERS

1. Penalties of three types are applied to candidates' work as follows:
   - Blunders - mathematical errors/omissions (-3)
   - Slips- numerical errors (-1)
   - Misreadings (provided task is not oversimplified) (-1).

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

2. When awarding attempt marks, e.g. Att(3), note that
   - any *correct, relevant* step in a part of a question merits at least the attempt mark for that part
   - if deductions result in a mark which is lower than the attempt mark, then the attempt mark must be awarded
   - a mark between zero and the attempt mark is never awarded.

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

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

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

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

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

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

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

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

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

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

QUESTION 1

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(15, 5) marks**	**Att (5, 2)**

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

(i) 57 + 43 =

(ii) 57 – 43 =

(a)	**5 marks**	**Att 2**
(i)	100	

* Accept correct answer without work.

Blunders (-3)

B1 Uses incorrect operator (with work)

Slips (-1)

S1 Arithmetic error in calculation (once only) – work shown

S2 Decimal error

Misreadings (-1)

M1 Error in copying down a digit (once only)

Attempts (2 marks

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

A2 Special Cases: 14 (-), 1.325 (÷), 2451 (x). 0.754 ($^{1}/_{\div}$), (without work)

Worthless (0)

W1 Incorrect answer without work

(a)	**5 marks**	**Att 2**
(ii)	14	

* Accept correct answer without work.

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 subtraction. [Evidence of operation- only one correct digit written down]

A2 Special Cases: 100 (+), 2451 (×), 1.325 (÷). 0.7543 (÷ reversed) (without work).

Worthless (0)

W1 Incorrect answer without work

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

(i) $344 \div 8 =$
(ii) $192 \times 2 + 4 =$
(iii) $\sqrt{64} =$
(iv) $3^4 =$

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

(i)	43

* Accept correct answer without work.

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: 0.0232558 … (8÷344), 2752, 352, 336 without work

Worthless (0)
W1 Incorrect answer without work

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

(ii)	384 + 4= 388

* Accept correct answer without work.

Blunders (-3)
B1 Uses incorrect operator (with work) once only. e.g. 192 × 6 = 1152
B2 Performs just one valid operation with work i.e. 192 ×2 = 384.

Slips (-1)
S1 Arithmetic error in calculation (once only)
S2 Decimal error

Misreadings (-1)
M1 Error in copying down digit (once only)

Attempts (2 marks)
A1 Any attempt at correct multiplication [Evidence of operation- only one correct digit written down]
A2 384 (without work)

Worthless (0)
W1 Incorrect answer with no work
W2 6 but 2 + 4 = 6 with work shown is att 2

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

(iii)	8

* Accept correct answer without work. (Maths Tables, Calculator)

Blunders (-3)

B1 $(64)^2 = 4096$ (with work)

B2 $64 \times 2 = 128$ or $64 \div 2 = 32$ (with work)

Slips (-1)

S1 Arithmetic error in calculation (just once)

S2 Decimal error

Misreadings (-1)

M1 Error in copying down digit (once only)

Attempts (2 marks)

A1 $(64)^{\frac{1}{2}}$ and stops

A2 64×2 or $64 \div 2$ & stops

A3 Special Cases: (4096), (128), (32) without work.

A4 Incorrect use of Mathematical Tables

Worthless (0)

W1 Incorrect answer without work

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

(iv)	81

* Accept correct answer without work.

* Performs the following incorrect operations and work is provided:

Blunders (-3)

B1 $3 \times 4 = 12$

B2 $4 \div 3 = 1.33$

B3 $4^{3.} = 64$

B4 $3 \div 4 = .75$

Slips (-1)

S1 Arithmetic error in calculation (once only)

S2 Decimal error

S3 $3 \times 3 \times 3 \times 3$ and stops, once only

M1 Error in copying down digit (just once)

Attempts (2 marks)

A1 3×4 and stops

A2 Special Cases: (12), (27), (9), (.75).1.732, 1.33,64 (without work)

A3 One or more correct step towards solution e.g. 3×3, $3 \times 3 \times 3$ and stops but see S3

Worthless (0)

W1 Incorrect answer without work

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

(i) Find the total cost of

2 Fruit Drinks @ €0·75 each
3 Scones @ €0·45 each
1 Sandwich @ €1·85

(ii) I pay for these items with a €10·00 note. How much change do I get?

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

(i)

Fruit Drinks:	€0·75 × 2	= €1· 50
Scones:	€0·45 × 3	= €1· 35
Sandwich:	€1·85 ×1	= €1· 85
	Total	= €4· 70

(15marks)

* No penalty for omission of **€** symbol.
* Accept answer in cents.
* CASE: 6 × 3· 08 = 18· 30 12m

Blunders (-3)
B1 Correct answer without work (4·70 or 470 or 4·7)
B2 Ignores multiples of items shown (once only) (does not perform any multiplication) ans. (3·05)
B3 Each item omitted from total (each time)
B4 Fails to add subtotals
B5 Incorrect operator with work

Slips (-1)
S1 Arithmetic error in calculation (each time to MAX.3 marks)
S2 Decimal error (each time to MAX 3)
S3 Incorrect multiples of items shown (each time to MAX 3)

Misreadings (-1)
M1 Error in copying component / digit

Attempts (marks)
A1 Any attempt at multiplication/addition. [Evidence of operation – only one correct digit written down]
A2 Answer with correct digits but incorrect decimal location (with no work)47, 4700

Worthless (0)
W1 Incorrect answer with no work, subject to A2.

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

(ii)	10 – 4·70 = 5·30

* Accept candidate's answer from (i).
* No penalty for omission of **€** symbol.
* Accept answer in cents.
* 4·70/470 written or used in this part.
* [Award att 5 retrospective to part (i) if **no marks** awarded previously]

* Case1: 4·70 - 10 = 5·30 (No Penalty)
Case 2: 4·70 - 10 = 4·60 (Blunder + Slip)

Blunders (-3)
B1 Correct answer without work
B2 Adds instead of subtracts
B3 Order of subtraction reversed.

Slips (-1)
S1 Arithmetic error in calculation (once only)
S2 Misplaced decimal (once only)

Misreadings (-1)
M1 Error in copying digits (once only)

Attempts (2 marks)
A1 Answer (i) written in this part

Worthless (0)
W1 Incorrect answer without work

QUESTION 2

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

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

Write down the mode of the following numbers

5, 8, 3, 2, 3, 6, 1

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

* Accept answer indicated. .

* CASE: If anything correct in Frequency Table → 4m

Blunders (-3)

B1 Frequency table constructed correctly.

Slips (-1)

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

Attempts (3 marks)

A1 Tries to find mean, with work.

A2 Numbers arranged in ascending or descending order but see B1.

A3 2 written as answer

A4 4 given as answer (mean)

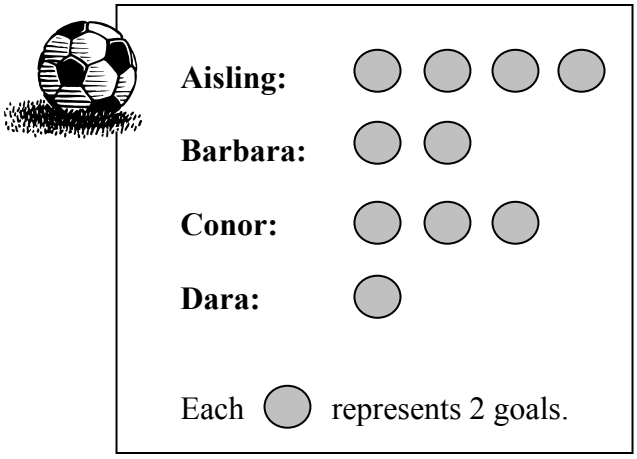
Worthless (0)

W1 Incorrect answer without work, but see A3, A4.

W2 1 ,6 ,5 , or 8

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

The pictogram shows the goals scored by four players in a school league last season.



(i) How many goals did Conor score last season?
(ii) What was the total number of goals scored by the four players?
(iii) What percentage of the total goals did Aisling score?

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

(i)	6

Blunders (-3)
B1 Not multiplying by 2

Slips (-1)
S1 Arithmetic error in calculation (once only)
S2 Chooses an incorrect player .i.e. 8 ,4 , 2 (4m)

Attempts (2 marks)
A1 Identifies Conor
A2 Ans. 1

.

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

(ii)	$10\times2 =$ **20** or $8+4+6+2 =$ **20** *or similar*

Blunders (-3)

B1 Correct answer without work
B2 Addition not complete
B3 Multiplies values
B4 Does not multiply by 2 i.e. Ans. 10
B5 Each player omitted.

Misreading (-1)

M1 Adds in extra symbol in diagram to total.

Slips (-1)

S1 Arithmetic error in calculation (MAX 3)

Attempts (3 marks)

A1 Draws a bar-chart or trend graph.

Worthless (0)

W1 Incorrect answer without work

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

$$\frac{8}{20}\times100 = \mathbf{40\%}$$

* % symbol not required

* Accept: $\frac{4}{10}\times100 = 40\%$ or $\frac{2}{5}\times100 = 40\%$

* Accept candidate's figures from previous parts.

Blunders (-3)

B1 Correct answer without work
B2 Incorrect numerator (but see note S3)
B3 Incorrect denominator
B4 Divides by 100

Slips (-1)

S1 Arithmetic error in calculation
S2 Decimal error
S3 Chooses an incorrect player.
S4 Fails to finish

Attempts (2 marks)

A1 Any use of 100.
A2 $\frac{8}{20}$ or similar & stops
A3 Some effort at %
A4 0.4 and stops
A5 5, 4, 8, 10 or 20 written & stops

Worthless (0)

W1 Incorrect answer without work

Part (c) **20 marks** **Att 7**

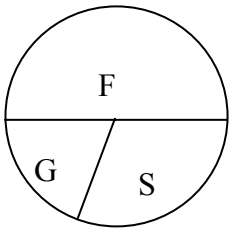
(c) 90 students were asked which language, French, German or Spanish, each was studying.
45 said French, 15 said German and the rest said Spanish.
Represent this information on a pie chart.

(c) **20 marks** **Att 7**

French: $\frac{45}{90}\times 360 = \mathbf{180}$ German: $\frac{15}{90}\times 360 = \mathbf{60}$ Spanish: 360 – (180 + 60) = **120** or equivalent.

Or $\frac{30}{90}\times 360=120$

Angles may not be exact



* Tolerance ± 5°
* It is only necessary to calculate any two angles.
* Accept candidate's calculated angles in pie chart.

Blunders (-3)
B1 Correct answer with no work
B2 Mathematical error in calculating angle once only
B3 Each segment not drawn or incorrectly drawn (MAX TWICE).
B4 No circle, but angles drawn
B5 Segments not meeting in centre and/or extra segments drawn.

Slips (-1)
S1 Arithmetic error in calculation
S2 Each label omitted or incorrect.

Attempts (7 marks)
A1 Circle drawn
A2 Draws bar chart, pictogram etc.
A3 Mention of 360°
A4 Gets 30
A5 Any work with 90, 45, 15 or 60 and stops.

Worthless (0)
W1 Incorrect answer without work

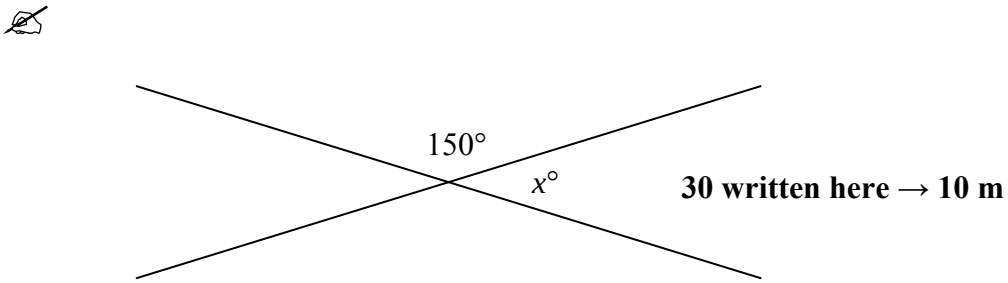
Case: If *no calculations/values for angles* shown and Pie chart with *3 segments* drawn

*	3 correct and correctly-labelled segments	1 × B = 17 m.
*	1 or more of segments incorrect but appropriately labelled	2 × B = 14 m.
*	3 correct segments but all unlabelled or mislabelled	3 × B = 11 m.
*	No segment correct but labelled	3 × B = 11m
*	1 or more segments incorrect and unlabelled	4 × B = 8 m.

QUESTION 3

Part (a)	**10 marks**	**Att 3**
Part (b)	**25(20, 5) marks**	**Att (7, 2)**
Part (c)	**15(10, 5) marks**	**Att (3, 2)**

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



30 written here → 10 m

$x =$

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

(a)	180 –150 = **30**

* No Penalty for degree symbol (°) missing.

Blunders (-3)

B1 Correct answer without work (✍)
B2 Performs addition (180 + 150 = 330)
B3 360 – 150 or 90 – 150 and continues to get an answer.

Slips (-1)

S1 Arithmetic error in calculation
S2 Decimal error

Misreadings (-1)

M1 Error in copying down a component/digit

Attempts (3 marks)

A1 Measures angle from diagram. (30°) ± 5° [Excluding 30]
A2 Any mention of 180°, 90’ or 360

Worthless (0)

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

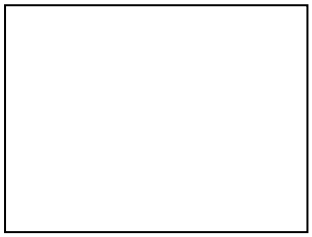
Part (b) **25(20, 5) marks** **Att (5, 2)**

(i) Construct a rectangle 8 cm long and 6 cm wide.

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

(b)(i) **20 marks** **Att 7**

(i)



not to scale

* Tolerance ± 0.5cm to the eye.
* Tolerance ± 0.5 degrees.

Blunders (-3)
B1 Vertices located but not joined.
B2 Omitted vertex.
B3 One or more angles incorrect or missing (may also incur B6).
B4 One or two sides outside tolerance.
B5 3 sides outside tolerance (also incurs B4)
B6 Absence of a right angle.

Slips (-1)
S1 Uses inches or consistent scale.

Attempts (5 marks)
A1 Any effort at locating points.
A2 Pilot Diagram (free-hand)
A3 Draws one or more disjoint lines.
A4 Any reasonable addition to given line.
A5 Only one length correct and stops

Worthless (0)
W1 Circle drawn

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

(ii) 10

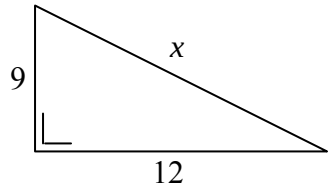
* Use candidate's diagram.
* Tolerance ± 0.5 cm
* Accept answer in mm.
* Accept correct Pythagoras calculation.

Attempts (2 marks)
A1 Any relevant work e.g. indicates a diagonal.
A2 Mentions or attempts to use Pythagoras's Theorem

Worthless (0)
W1 Incorrect answer without work

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

(c) (i) Use the Theorem of Pythagoras to find the length of the side marked *x* in the right-angled triangle



* 9 , 12 ,15 i.e. recognises Pythagorean Triple.

Blunders (-3)

B1 Correct answer with no work shown

B2 Mathematical error in squaring (once) e.g. $9^2 = 18$

B3 Fails to get √

B4 Mathematical error in getting √

Slips (-1)

S1 Arithmetic slip (MAX 3)

Attempts (3 marks)

A1 $9 + 12 = 21$ or $9 \times 12 = 108$

A2 Measures length: ± 0·5 cm. (4·3 cm)

A3 One or more squares drawn on sides.

A4 x^2 or 9^2 or 12^2 and stops

A5 Candidate states Pythagoras's Theorem.

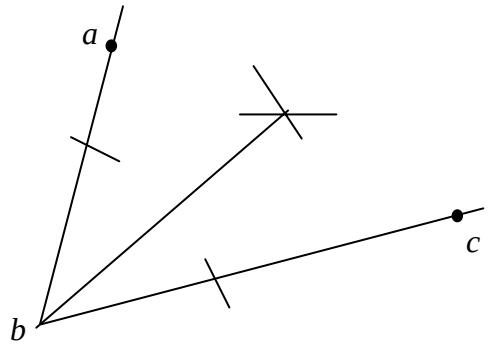
A6 Indicates *x* is the hypotenuse, but see A2

Worthless (0)

W1 Incorrect answer without work

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

(ii) Bisect the angle *abc*.
Show all construction lines.



* Tolerance ± 0.5cm. Tolerance of angle ± 5°

Blunders (-3)
B1 Unequal subdivisions of construction line (once).
B2 Arcs unequal and meet off centre.
B3 Subdivisions outside tolerance

Attempts (2marks)
A1 Any relevant step, i.e. any arc drawn.
A2 Joins *a* to *c*.

Worthless (0)
W1 Draws external line.

QUESTION 4

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

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

(a) Write $\frac{1}{4}$ as a decimal

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

(a) **0·25**

.

Blunders (-3)

B1 Fraction inverted, i.e. 4·0

B2 Incorrect operator with or without work

B3 Rounds 0·25 to 0·2 or 0·3 without work.

Slips (-1)

S1 Misplaced decimal point.

Attempts (3marks)

A1 Any effort at division and stops

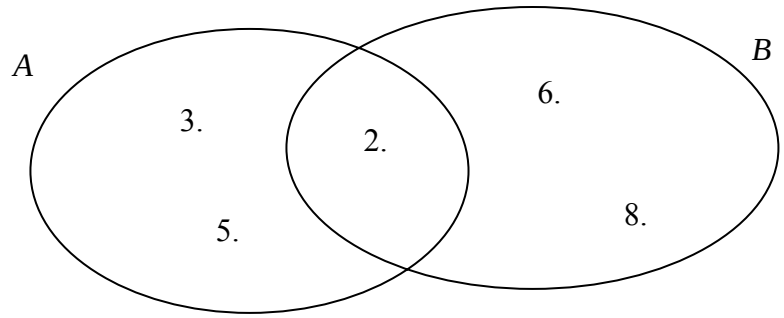
A2 **Special Cases**: 1·4, 4·1.

A3 Mentions 100

W*orthless (0)*

W1 Incorrect answer without work

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



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

(ii) $A \cup B = \{\ \ ,\ \ ,\ \ ,\ \ ,\ \ ,\ \ \}$

Insert the correct symbol $\in$ or $\notin$ in the boxes below.

(iii) 8 ☐ A

(iv) 6 ☐ $(A \cup B)$

* Accept appropriate shading, but answers must be distinguishable.

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

(i) A = { 2, 3, 5 }

Blunders (-3)

B1 Shades Set

Slips(-1)

S1 Each additional element.

Case:

*	**One correct entry**	**2 marks**
*	**Two correct entries**	**4 marks**
*	**Three correct entries**	**5 marks**

Attempts 2 marks)

A1 6 or 8 appears, only.

W*orthless (0)*

W1 Any number not in $A \cup B$

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

b(ii)	$A \cup B = \{2, 3, 5, 6, 8\}$

* Accept appropriate shading.

Blunders(-3)

B1 Shades intersection

Case:

*	One or Two correct entries	2 marks
*	Three correct entries	3 marks
*	Four correct entries	4 marks
*	Five correct entries	5 marks

Attempts (2 marks)

A1 Mentions together or similar.

b (iii), b (iv) **10 marks** **Att. 3**

(iii) 8 $\boxed{\notin}$ A

(iv) 6 $\boxed{\in}$ $(A \cup B)$

* Both correct 10 marks.

* One correct 5 marks

Attempts 3 marks

A1 Symbols interchanged.

A2 Writes is '*an element of*' or similar somewhere.

W*orthless (0)*

W1 More than one symbol in or outside boxes

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

(c) Mary works 35 hours per week. She is paid €11 per hour.

(i) Find Mary's gross pay per week.

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

(iii) What is Mary's take home pay if she has a weekly tax credit of €52?

(c)(i)	**10 marks**	**Att 3**
(i)	$11 \times 35 = €385$	

***** No penalty for omission of **€** symbol.

Blunders (-3)
B1 Correct answer without work shown
B2 Addition instead of multiplication
B3 Fails to finish.

Slips (-1)
S1 Arithmetic error in calculation
S2 Decimal error.

Misreadings (-1)
M1 Error in copying down a component

Attempts (3 marks)
A1 Mention of any of 11, 35, 6 or 7

Worthless (0)
W1 Any other incorrect answer without work
W2 Uses division or subtraction.

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

(ii)	$385 \times 20\% = €77$ *or* $20\% = {}^{1}/_{5}$ $385 \div 5 = €77$

* Accept candidate's answer from previous part.

Blunders (-3)

B1 Correct answer without work

B2 Inverts (once) e.g. $(385 \times \frac{100}{20})$

B3 $20\% \neq 0{\cdot}2$ or $\frac{1}{5}$.

B4 Fails to finish.

B5 Fails to multiply by 20 to give an answer or multiplies by a value other than 20.

B6 No use of %, i.e. not introduce 100.

Slips (-1)

S1 Arithmetic error in calculation to MAX 3

S2 Decimal error

Misreadings (-1)

M1 Error in copying down a component/digit

Attempts (2 marks)

A1 Any relevant step e.g. mentions 100 & stops.

A2 Any mention of $0{\cdot}2$ or $\frac{1}{5}$

A3 Gets 20% of any number

Worthless (0)

W1 385 ± 20

(c)(iii) **5marks** **Att 2**

(iii) 77 - 52 = 25 385 – 25 = **€360** or similar

* Accept candidate's answers from part (ii) or (i)
* No penalty for omission of **€** symbol.

Blunders (-3)
B1 Correct answer without work
B2 Subtracts answer in c (ii) from 385.
B3 Incorrect or omitted step.
B4 Fails to finish.
B5 Adds instead of subtracts

Slips (-1)
S1 Arithmetic error in calculation each time
S2 Misplaced decimal each time.

Misreadings (-1)
M1 Error in copying down a component/digit

Attempts (3 marks)
A1 Some effort at % calculation
A2 Mentions 385 or 77 Applies without work
A3 Any relevant step

Worthless (0)
W1 11 ± 52 or 35 ± 52

QUESTION 5

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

Part (a)	**10 marks**	**Att 3**
(a)	Find the value of $5x + 2$ when $x = 3$.	

(a)	**10 marks**	**Att 3**
(a)	$5(3) + 2 = 15 + 2 =$ **17**	

Blunders (-3)
B1 Correct answer without work
B2 Association error e.g. 5(3+2) = 5(5) = 25.
B3 Mathematical error e.g. [5(3) +2 = 53 +2 = 55] or [5(3) +2 = 8+2 = 10]

Slips (-1)
S1 Arithmetic error in calculation MAX 3

Misreadings (-1)
M1 Error in copying down a component

Attempts (3 marks)
A1 $5x + 2 = 3$ and continues.
A2 Any correct step e.g. 5 (3) & stops

Worthless (0)
W1 Incorrect answer without work
W2 Any division

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

(b) **(i)** Solve for x :

$x + 3 = 10$

(ii) Solve for x :

$3(x - 2) = 18$

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

(b) (i) $x + 3 = 10 \rightarrow \quad x = 10 - 3 \rightarrow \quad x = \mathbf{7}$

* Accept successful Trial and Error with work. e.g. 7 + 3 = 10

Blunders (-3)

B1 Correct answer without work
B2 Transposition error (once)
B3 Mathematical error e.g. $x + 3$ as $3x$
B4 Ignores 10 & continues. i.e. $x + 3 = 0 \quad \Rightarrow x = -3$.
B5 Fails to finish e.g. $x = 10 - 3$ and stops.

Slips (-1)

S1 Arithmetic errors in calculation (Max 3)

Misreadings (-1)

M1 Error in copying down equation (If task is not oversimplified)

Attempts (3 marks)

A1 Unsuccessful Trial and Error.

Worthless (0)

W1 Incorrect answer without work
W2 $x = 10$.

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

(b) (ii)	I	$3(x-2) = 18 \Rightarrow 3x - 6 = 18 \Rightarrow 3x = 18 + 6 = 24 \Rightarrow x = \mathbf{8}$
	II	$x - 2 = \frac{18}{3} \Rightarrow x - 2 = 6 \Rightarrow x = 6 + 2 = 8$

* Accept successful Trial and Error with work, .i.e. 8 appears over *x* or 3(8-2) =18→ full marks.

Blunders (-3)

B1 Correct answer without work
B2 Distribution error (once)
B3 Transposition error (each time) e.g. Method II: $x - 2 = 18 - 3 = 15 \Rightarrow x = 15 + 2 = 17$
B4 Mathematical error e.g. $x - 2$ as $2x$
B5 Ignores 18 and continues.
B6 Ignores 3 or -2, and continues.

Slips (-1)

S1 Arithmetic errors in calculation (Max 3)

Misreadings (-1)

M1 Error in copying down equation (If task is not oversimplified) See B5, B6.

Attempts (3 marks)

A1 Unsuccessful Trial and Error.
A2 Any relevant step e.g. $3x$ and stops or similar.

Worthless (0)

W1 Incorrect answer without work
W2 $x = 18$.

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

(i) Given that $y = x + 4$, complete the table below:

x	1	2	3	4	5
y			7		

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

(i) $y = 1 + 4 = \mathbf{5}$; $y = 2 + 4 = \mathbf{6}$; $y = 4 + 4 = \mathbf{8}$; $y = 5 + 4 = \mathbf{9}$.

x	1	2	3	4	5
y	5	6	[7]	8	9

* Answers need not be written in table. i.e. Correct answers with work full marks
* Correct answers without work full marks

*	1 correct	3 marks
*	2 correct	4 marks
*	3 correct	7 marks
*	4 correct	10 marks

Blunders (-3)

B1 Each entry omitted or incorrect. [Assuming at least one correct entry] unless consistent.
B2 Mathematical error e.g. $y = 4x$.(once)
B3 Calculation error, once if consistent, i.e. $y = x$.
B4 If Graph fully correct and no entry in table or work shown. i.e. 7marks here in (c) (i)

Slips (-1)

S1 Adds in top line of table. (watch for consistency)
S2 Arithmetic error in calculation (Max 3)

Misreadings (-1)

M1 Error in copying down equation (If task is not oversimplified)

Attempts (3 marks)

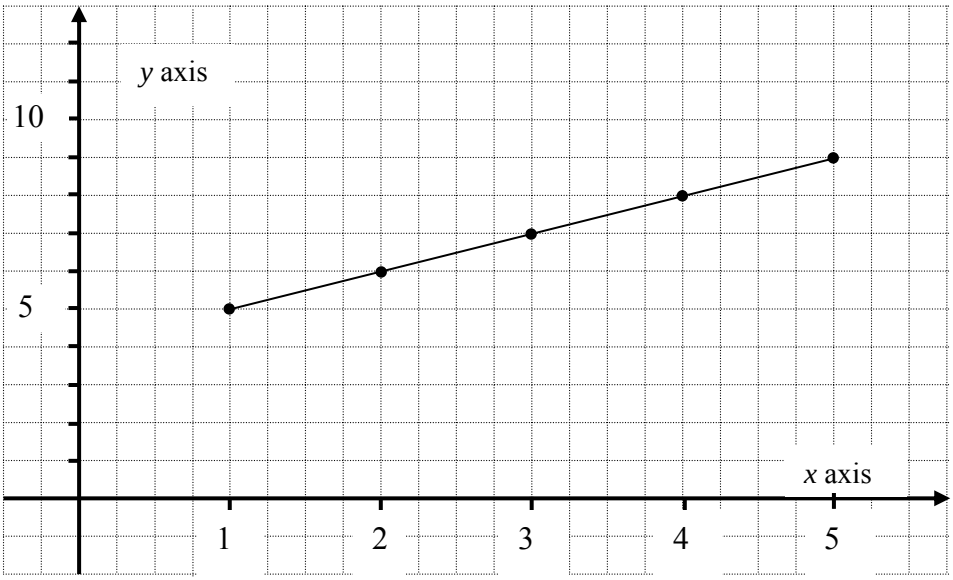
A1 Any one correct entry with / without work

Worthless (0)

W1 Table completed with spurious numbers.
W2 Copies down table, with no additional work.

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

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



* Tolerance ± 0.5 (± 1 Box on grid)

* Permit work from c (i).

Blunders (-3)

B1 Scale error. (once)

B2 Draws histogram or bar chart.

Slips (-1)

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

S2 All points not joined.

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

Attempts (3 marks)

A1 Random straight line

A2 One correct point

QUESTION 6

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

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

(a) (i) Change 3·8 km to metres.

(ii) Change 2·5 m to centimetres.

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

(i) $3{\cdot}8 \times 1000 = 3800$ m

(ii) $2{\cdot}5 \times 100 = 250$ cm

* No penalty for missing units.

* CASE: $3{\cdot}8 \times 100 = 380$ B2
$3{\cdot}8 \times 1000 = 380$ S1

Blunders (-3)

B1 Correct answer without work

B2 1 km not equal to 1000 m

Slips (-1)

S1 Arithmetic error in calculation

S2 Decimal error

S3 Rounds 3·8 to 4 and continues correctly.

Misreadings (-1)

M1 Error in copying down a digit

Attempts (2 marks)

A1 Any mention of 1000

Worthless (0)

W1 Incorrect answer without work

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

(ii) $2{\cdot}5 \times 100 = 250$ cm

* No penalty for missing units.
* CASE: $2{\cdot}5 \times 10 = 25$ B2
$2{\cdot}5 \times 100 = 25$ S2

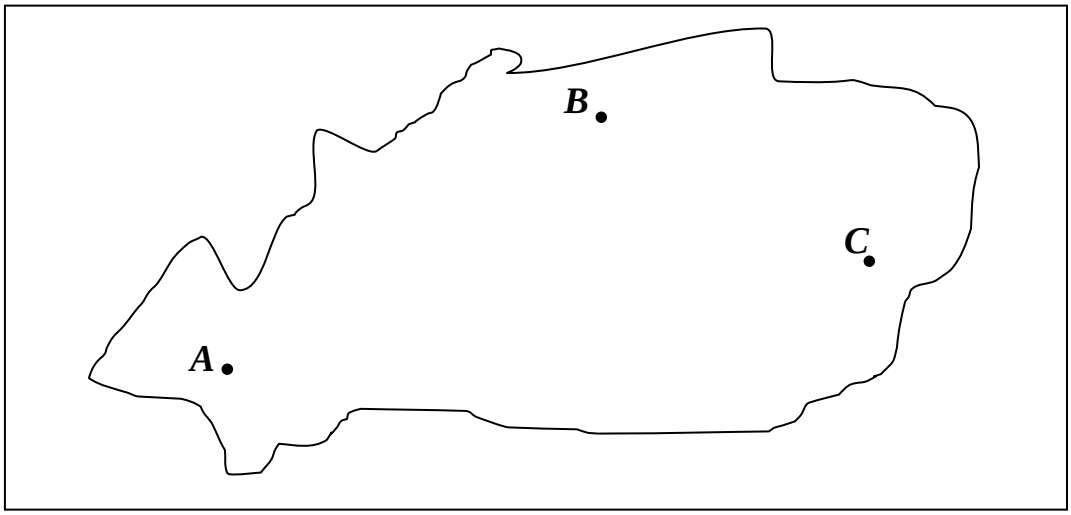
Blunders (-3)
B1 Correct answer without work
B2 1 m not equal to 100 cm

Slips (-1)
S1 Arithmetic error in calculation
S2 Decimal error
S3 Rounds 2·5 to 3 and continues correctly

Attempts (2 marks)
A1 Any mention of 100

Worthless (0)
W1 Incorrect answer without work

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



The diagram shows the location of three towns *A*, *B* and *C*.
Using a ruler and taking 1 cm = 20 km,

(i) estimate the distance, in km, from *A* to *B*
(ii) estimate the total distance, in km, from *A* to *C* through *B*.

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

(i)	A to B: $6 \times 20 = 120$ km

* No penalty for missing units
* Allow tolerance ±1 cm

Blunders (-3)
B1 Correct answer without work
B2 Divides by 20
B3 6 + 20 = 26
B4 Fails to use 20
B5 Uses a number outside tolerance but watch out for mm.

Slips (-1)
S1 Arithmetic error
S2 Uses inches or consistent scale.
S3 Fails to finish (6 × 20 and stops)

Attempts (3 marks)
A1 Mentions 20
A2 Line or arrow drawn on diagram from *A* to *B*

Worthless (0)
W1 Incorrect answer with no work

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

(ii) B to C: $4 \times 20 = 80 \rightarrow$ total: $120 + 80 = 200$ km

* No penalty for missing units
* Accept answer in b (i)
* Allow tolerance ± 1 cm

*	Ans: 4	3 marks
*	Ans: 4×20	3 marks
*	Ans: $4 \times 20 = 80$	4 marks
*	Ans: 120, 80	6 marks
*	Ans: $120 + 80$	7 marks
*	Ans: $120 + 80 = 200$	10 marks

Blunders (-3)
B1 Correct answer without work
B2 No multiplication by 20
B3 Divides or adds by 20
B4 Gets $|AC|$, i.e. (8·5), only and continues to get ans 170
B5 Fails to indicate addition.

Slips (-1)
S1 Arithmetic error each time to MAX 3
S2 Fails to finish.
S3 Uses inches or consistent scales.

Attempts (3 marks)
A1 Mentions 20 and/or 4
A2 Mentions *AC* or *BC*
A3 Mention answer from b (i) here.
A4 Arrows or lines on diagram from *A* to *C* or *B* to *C*
.
Worthless (0))
W1 Incorrect answer with no work

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

(i) The diameter of a circle measures 12 cm.
Write down the length of the radius.

(ii) The diameter of a cylinder is 12 cm and its height is 30 cm.
Find the volume of the cylinder, taking $\pi = 3{\cdot}142$.

C (i) 10 marks Att 3

(i) $\frac{12}{2} = 6$

Blunders (-3)
B1 Multiplies by 2

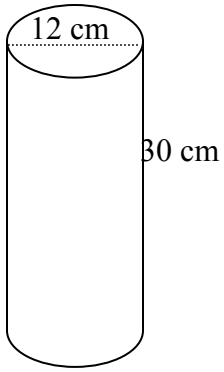
Slips (-1)
S1 Arithmetic error in calculation

Misreadings (-1)
M1 Error in copying down a digit

Attempts (3 marks)
A1 Effort to get circumference or area (with or without substitution)
A2 Gets 144
A3 Indicates diameter or radius in a sketch
A4 A phrase that attempts a definition of diameter or radius
.
Worthless (0)
W1 Incorrect answer without work

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

(ii) Volume = $\pi r^2 h$
= $3.142 \times (6)^2 \times 30$
= $3393.36\ cm^3$



* No penalty for using π from calculator, answer (3392.92)

* If other variation of π used S (-1) applies to the following answers:

$\pi = \frac{22}{7}(1080) \Rightarrow 3394{\cdot}286$; $\pi = 3{\cdot}14\ (1080) \Rightarrow 3391{\cdot}2$**;** $\pi = 3{\cdot}1\ (1080) \Rightarrow 3348$**;**

$\pi = 3\ (1080). \Rightarrow 3240$

Blunders (-3)

B1 Correct answer without work
B2 Each incorrect or omitted substitution
B3 Mathematical error $6^2 = 12$
B4 Value of π not used in calculation i.e. Answer (1080)

Slips (-1)

S1 Arithmetic error in calculation, to MAX 3
S2 Decimal error
S3 Fails to finish from $3{\cdot}142 \times 36 \times 30$.

Misreadings (-1)

M1 Error in copying down a digit

Attempts (3 marks)

A1 Mentions radius = 6 or value from (i)

Worthless (0)

W1 Incorrect formula with π, and stops
W2 Incorrect answer without work