

An Roinn Oideachais agus Eolaíochta

Junior Certificate Examination 2001

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

QUESTION 1

Part (i)	10 marks	Att 3
Part (ii)	5 marks	Att 2

Part (i)	10 marks	Att 3
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A bill of IR£68 was shared equally by 4 people

How much did each person have to pay?

(i)	10 marks	Att 3
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$$\text{IR£}68 \div 4 = \text{IR£}17$$

Blunders (-3)

B1 IR£68 × 4

B2 divides by a number other than 4

Slips (-1)

S1 error in calculations, once only

S2 incorrect or no decimal point.

Attempts (3 marks)

A1 IR£68 ± 4

Part (ii)	5 marks	Att 2
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IR£20 was collected from each person.

How much change did each receive?

(ii)	5 marks	Att 2
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$$\text{IR£}20 - \text{IR£}17 = \text{IR£}3$$

Blunders (-3)

B1 Adds IR£20 to part (i) answer

Slips (-1)

S1 adds IR£20 + IR£20 + IR£20 + IR£20 and takes IR£68 from answer.

S2 error in calculations, once only

S3 incorrect or no decimal point

N B Work with candidates total from (i) in part (ii)

QUESTION 2

15 marks

Att 5 marks

15 marks

Att 5 marks

Find the total cost of these items.

ITEM	IR£
Calculator	6 55
Pen	2 53
Pencil	0 35
Compass	0 85
Set Square	0.55

15 marks

Att 5 marks

$$\text{IR£}6\ 55 + \text{IR£}2\ 53 + \text{IR£}0\ 35 + \text{IR£}0\ 85 + \text{IR£}0\ 55 = \text{IR£}10.83$$

Blunders

B1 subtracts, apply each time

Slips (-1)

S1 error in calculations, apply once only

S2 each item left out

S3 incorrect or no decimal point

Misreading

M1 any item incorrectly copied down, each time

QUESTION 3

Part (i)	5 marks	Att 2
Part (ii)	10 marks	Att 3

Part (i)	5 marks	Att 2
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What is the lowest number that 2, 3 and 5 will divide into evenly?

Part (i)	5 marks	Att 2
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Lowest number is 30

Blunders (-3)

B1 number divisible by 2, 3 or 5 but not by all three

Slips (-1)

S1 number other than 30 divisible by 2, 3 and 5

Part (ii)	10 marks	Att 3
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Write $\frac{1}{2} + \frac{2}{3} - \frac{3}{5}$ as a single fraction

Part (ii)	10 marks	Att 3
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$$\frac{1}{2} + \frac{2}{3} - \frac{3}{5} = \frac{15}{30} + \frac{20}{30} - \frac{18}{30} = \frac{17}{30}$$

or
$$\frac{1}{2} + \frac{2}{3} - \frac{3}{5} = \frac{7}{6} - \frac{3}{5} = \frac{35}{30} - \frac{18}{30} = \frac{17}{30}$$

Blunders(-3)

B1 incorrect denominator

B2 incorrect numerators, once only

B3 any fraction omitted

Slips (-1)

S1 error in addition or subtraction

S2 error in equivalent decimal or percentage, each time

Attempts (3)

A1 any relevant decimal or percentage equivalent correctly calculated

QUESTION 4

15 marks

Att 5 marks

15 marks

Att 5 marks

A bicycle was bought for IR£132 It was sold at a profit of 25%
What was the selling price?

15 marks

Att 5 marks

$$\frac{IR£132}{1} \times \frac{25}{100} + 132 = IR£165$$

or
$$\frac{IR£132}{1} \times \frac{125}{100} = IR£165$$

or
$$IR£132 \times 1.25 = IR£165$$

Blunders (-3)

B1 inverts any of the fractions, for example $\frac{1}{132}$ or $\frac{100}{25}$ or $\frac{132}{25}$

B2 $132 \times 100 \times 25$ or 132×4

B3 does not add on the profit, or subtracts profit

Slips(-1)

S1 error in calculations, once only

S2 misplaced decimal point

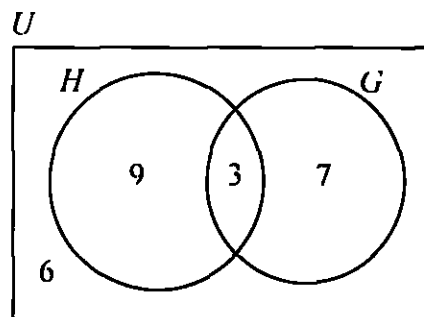
Attempts(5)

A1 writes down one relevant fraction and stops

QUESTION 5

Part (i)	5 marks	Att 2
Part (ii)	5 marks	Att 2
Part (iii)	5 marks	Att 2

U is the set of pupils in a class
 H is the set of pupils who study History
 G is the set of pupils who study Geography



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

How many pupils study neither History nor Geography?

Answer 6 pupils

Blunders (-3)

B1 makes no use of 6 in calculations

Slips(-1)

S1 any incorrect use of 6 in calculations

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

How many pupils study both?

Answer 3

Blunders (-3)

B1 makes no use of 3 in calculations

Slips(-1)

S1 any incorrect use of 3 in calculations

Misreading(-1)

M1 $9 + 3 + 7$ i.e. mistakes "both" for "any"

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

How many pupils study History?

Answer $9 + 3 = 12$

Blunders (-3)

B1 Makes no use of 3 in calculations.

Slips (-1)

S1 error in calculations

S2 $9 - 3 = 6$ or $7 + 3 = 10$ or $6 + 3 = 9$

QUESTION 6

Part (i)	10 marks	Att 3
Part (ii)	5 marks	Att 2

Part (i)	10 marks	Att 3
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A train leaves Cork at 10 45

(i) It takes 23 minutes to reach Mallow

At what time does it arrive in Mallow?

$$10\ 45 + 23\ \text{mins} = 11\ 08$$

Blunders (-3)

B1 takes 1hr = 100mins or leaves answer as 10 68

B2 subtracts 23 from 10 45

Slips (-1)

S1 error in calculations, once only

Attempts (3)

A1 writes 1hr = 60 mins

Part (ii)	5 marks	Att 2
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(ii) The train arrives in Thurles at 12 12 How long does it take the train to travel from Cork to Thurles?

$$12\ 12 - 10\ 45 = 1\ \text{hr and } 27\ \text{mins}$$

Blunders (-3)

B1 1hr = 100 mins, if not already penalised above

B2 $12\ 12 + 10\ 45 = 22\ 57$

Slips (-1)

S1 error in calculations, once only

Misreading(-1)

M1 calculates time taken to go from Mallow to Thurles (1hr 4 mins)

QUESTION 7

Part (i)	5 marks	Att 2
Part (ii)	10 marks	Att 3

A bus travels 240 km in 3 hours

- (i) Calculate its average speed in km/hour
- (ii) A second bus makes the same journey at an average speed of 60 km/hour.
How long does this bus take?

Part (i)	5 marks	Att 2
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Calculate its average speed in km/hour

$$\text{Speed} = \frac{240}{3} = 80 \text{ km/h}$$

Blunders (-3)

- B1 $\frac{3}{240}$
B2 240×3

Slips (-1)

S1 error in calculations, once only

Attempts (2)

A1 writes down formula for average speed

Part (ii)	10 marks	Att 3
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- (ii) A second bus makes the same journey at an average speed of 60 km/hour
How long does this bus take?

$$\text{Time} = \frac{240}{60} = 4 \text{ hrs}$$

Blunders (-3)

- B1 $\frac{60}{240}$
B2 60×240

Slips (-1)

S1 error in calculations, once only

QUESTION 8

15 marks

Att 5

15 marks

Att 5

The table shows the number of absent pupils each day during a certain week.

Day	Mon	Tues	Wed	Thurs	Fri
Number of Pupils	3	4	2	1	5

Find the mean (average) number of pupils absent per day

$$\text{Mean} = \frac{3+4+2+1+5}{5} = \frac{15}{5} = 3 \text{ days}$$

Blunders (-3)

B1 does not divide by any number

Slips (-1)

S1 error in calculations

S2 incorrect denominator

QUESTION 9

Part (i)	5 marks	Att 2
Part (ii)	10 marks	Att 3

Find the value of

(i) $11 + 11 + 0.11$

(ii) $(2.34 \times 10) + (2.34 \times 100)$

Part (i)	5 marks	Att 2
-----------------	----------------	--------------

$$11 + 11 + 0.11 = 22.11$$

Slips (-1)

S1 misplaced decimal point in calculations

S2 error in calculations, once only

Misreading(-1)

M1 each item incorrectly copied down

Part (ii)	10 marks	Att 3
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$$(2.34 \times 10) + (2.34 \times 100) = 23.4 + 234 = 257.4$$

Slips (-1)

S1 misplaced decimal point

S2 error in calculations

Misreading(-1)

M1 subtracts in (ii)

QUESTION 10

Part (a)	5 marks	Att 2
Part (b) (i)	5 marks	Att 2
Part (b) (ii)	5 marks	Att 2

<p>(a) Find the value of x when $3x - 1 = 11$</p> <p>(b) When $x = 4$ and $y = 3$, find the value of</p> <p style="margin-left: 20px;">(i) $3x - 2y$</p> <p style="margin-left: 20px;">(ii) $x^2 + 2x - 4$</p>
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Part (a)	5 marks	Att 2
-----------------	----------------	--------------

$3x - 1 = 11$ $3x = 11 + 1$ $3x = 12$ $x = 4$

Blunders (-3)

B1 transposition error

Slips (-1)

S1 error in calculations

Part (b) (i)	5 marks	Att 2
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$x = 4 \text{ and } y = 3$ $3x - 2y = 3(4) - 2(3) = 12 - 6 = 6$

Blunders (-3)

B1 no multiplication i.e. $3 \cdot 4$ or $3 + 4$

Slips (-1)

S1 error in calculations

Part (b) (ii)	5 marks	Att 2
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$x^2 + 2x - 4 = (4)^2 + 2(4) - 4 = 16 + 8 - 4 = 20$

Blunders (-3)

B1 does not square 4

B2 no multiplication

Slips (-1)

S1 error in calculations

QUESTION 11

Part (i)	10 marks	Att 3
Part (ii)	5 marks	Att 2

An electricity bill shows the following meter readings

READING	PRESENT	PREVIOUS
UNITS	83 981	82 869

- (i) How many units were used between these two readings?
- (ii) Find the total cost of the units if each unit costs 7 5p

Part (i)	10 marks	Att 3
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Present = 83 981
Previous = 82 869
Used = 1112

Blunders (-3)

B1 $83\,981 + 82\,869$

Slips (-1)

S1 error in calculations

Part (ii)	5 marks	Att 2
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Cost = $1112 \times 7\,5\text{p} = 8340$ or IR£83 40
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Blunders (-3)

B1 $1112 - 7\,5$

Slips (-1)

S1 error in calculations

S2 multiplies 83 981 or 82 869 by 7 5

S3 error in decimal point

QUESTION 12

Part (i)	5 marks	Att 2
Part (ii)	5 marks	Att 2
Part (iii)	5 marks	Att 2

Find, using Tables, pages 20 – 25.

(i) $\sqrt{15\ 21}$

(ii) $(3\ 6)^2$

(iii) $\sqrt{15\ 21} + (3\ 6)^2$, correct to the nearest whole number

Part (i)	5 marks	Att 2
-----------------	----------------	--------------

$$\sqrt{15\ 21} = 3\ 9$$

Blunders (-3)

B1 multiplies or divides 15 21 by 2

B2 looks up wrong page but watch for S1 or $\sqrt{1\ 521} = 1\ 233$

Slips (-1)

S1 15 21 by 15 21 or looks up 15 21²

S2 misplaced or no decimal point

S3 reads from wrong line or column in Tables

S4 rounds off and continues

S5 error in calculations

Part (ii)	5 marks	Att 2
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$$(3\ 6)^2 = 12\ 96$$

Blunders (-3)

B1 multiplies or divides 3 6 by 2

B2 looks up wrong page in Tables, but watch for S1

Slips (-1)

S1 looks up $\sqrt{3\ 6}$ or $\sqrt{36}$

S2 misplaced or no decimal point

S3 reads from wrong line or column in Tables

S4 $3\ 6 \times 3\ 6$ and stops

S5 error in calculations

Part (iii)	5 marks	Att 2
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$$\sqrt{15\ 21} + (3\ 6)^2 = 3\ 9 + 12\ 96 = 16.86 = 17$$

Slips (-1)

S1 error in calculations, once only

S2 incorrect or no rounding off

N B Use candidates results from (i) and (ii) without further penalty

QUESTION 13

Part (i)	10 marks	Att 3
Part (ii)	5 marks	Att 2

The marks given to 20 pupils in a test are shown below

5	3	4	4	5
4	2	1	2	4
3	1	3	1	3
4	5	2	3	4

(i) Copy and complete the table

Mark	1	2	3	4	5
Number of Pupils		3			

(ii) Write down the mode

Part (i)	10 marks	Att 3
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Mark	1	2	3	4	5
Number of Pupils	3	3	5	6	3

Slips (-1)

S1 each incorrect or omitted value on candidate's copy of table

Part (ii)	5 marks	Att 2
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Mode = 4

Slips (-1)

S1 calculates the mean

S2 gives 6 as the answer

QUESTION 14

Part (i)

10 marks

Att 3

Part (ii)

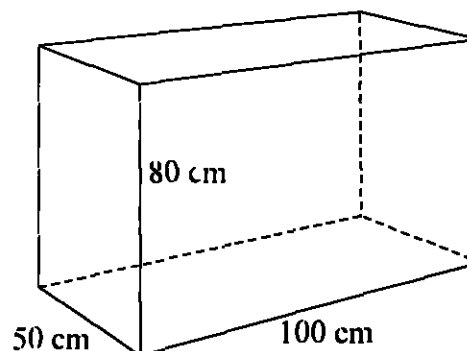
5 marks

Att 2

A rectangular tank measures 100 cm × 50 cm × 80 cm

(i) Find the volume of the tank in cm^3 .

(ii) Find the volume of the tank in litres
(1 litre = 1000 cm^3)



Part (i)

10 marks

Att 3

$$\text{Volume} = 100 \times 80 \times 50 = 400000$$

Blunders (-3)

B1 calculates area of any side and stops, or any two dimensional calculation.

Slips (-1)

S1 correctly calculates the total surface area

S2 error in calculations

Attempts(3)

A1 $50 + 80 + 100$

Part (ii)

5 marks

Att 2

$$\text{Volume} = \frac{400000}{1000} = 400 \text{ litres}$$

Blunders (-3)

B1 400000×1000

Slips (-1)

S1 error in calculations

S2 division by a number other than 1000

QUESTION 15

Part (i)	10 marks	Att 3
Part (ii)	5 marks	Att 2

IR£500 earns 8% per annum compound interest for 2 years.

Calculate the interest for the first year

(ii) Calculate the interest for the second year

Part (i)	10 marks	Att 3
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$$\text{Interest} = \frac{IR£500}{100} \times \frac{8}{1} = IR£40$$

Blunders (-3)

- B1 IR£500 divided by 8
- B2 8 divided by 500
- B3 IR£500 divided by 100 and stops

Slips (-1)

- S1 error in calculations
- S2 misplaced decimal point

Attempts (3)

- A1 $I = \frac{P \times r \times R}{100}$ or identifies P, r or R correctly

Part (ii)	5 marks	Att 2
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$$\text{Interest} = \frac{IR£540 \times 8}{100} = IR£43.20$$

Blunders (-3)

- B1 IR£540 divided by 8
- B2 8 divided by 540
- B3 IR£540 divided by 100 and stops
- B4 does not add on the interest.

Slips (-1)

- S1 error in calculations
- S2 misplaced or no decimal point

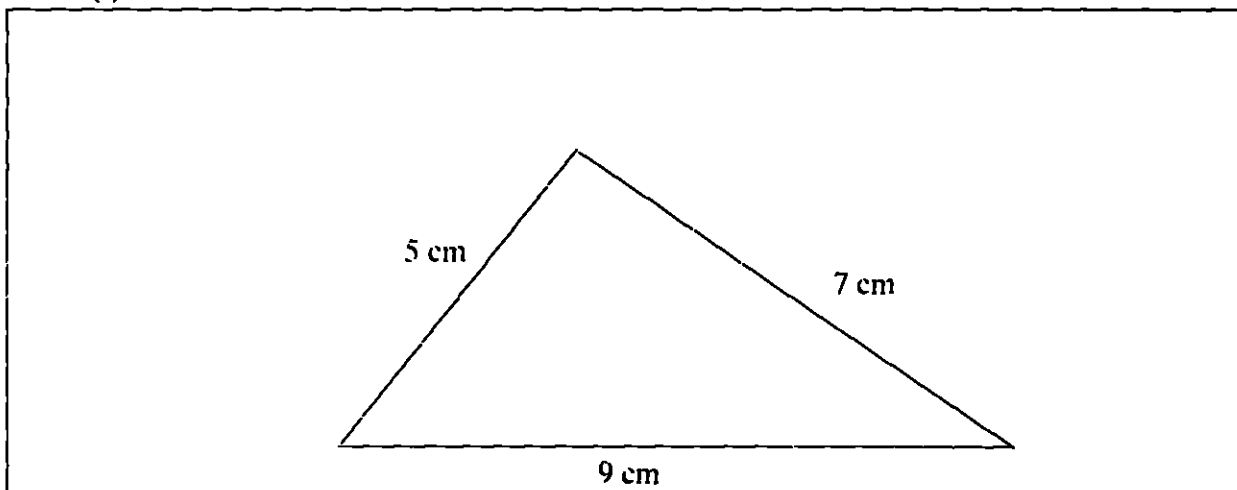
QUESTION 16

Part (i)	10 marks	Att 3
Part (ii)	5 marks	Att 2

Using a ruler and compass, construct a triangle with sides 5 cm, 7 cm and 9 cm

Use a protractor to measure the smallest angle and write down your answer.

Part (i)	10 marks	Att 3
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Blunders (-3)

B1 each side omitted

Slips (-1)

S1 sides outside of tolerance of $\pm 1\text{cm}$, each time

S2 uses inches, penalise once only

Part(ii)	5 marks	Att 2
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Smallest angle = 34°

Slips (-1)

S1 incorrect measurement (allow a tolerance of $5''$, using candidate's triangle)

Misreading(-1)

M1 does not use the smallest angle

Attempts(2)

A1 states that the sum of the angles in a triangle equals 180°

A2 any number outside range

QUESTION 17

Part (i)

5 marks

Att 2

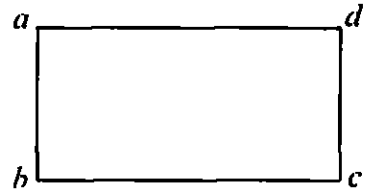
Part (ii)

10 marks

Att 3

(i) Copy the rectangle $abcd$ into your answerbook

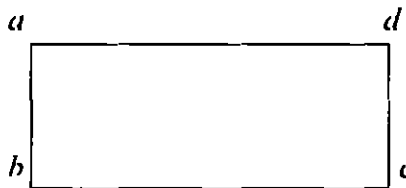
(ii) Construct its image under the translation \overrightarrow{dc}



Part (i)

5 marks

Att 2



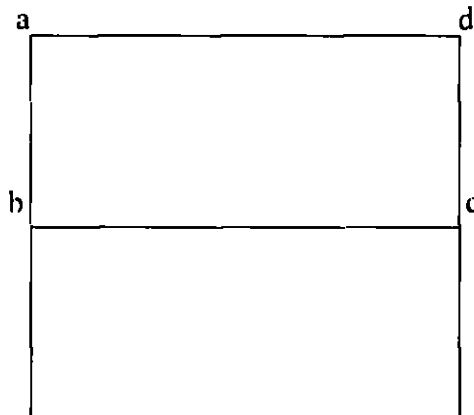
Blunders (-3)

B1 shape drawn is not a rectangle

Part (ii)

10 marks

Att 3



Slips (-1)

S1 each incorrect vertex or each vertex omitted

S2 vertices plotted but not joined

QUESTION 18

Part (i)

10 marks

Att 3

Part (ii)

5 marks

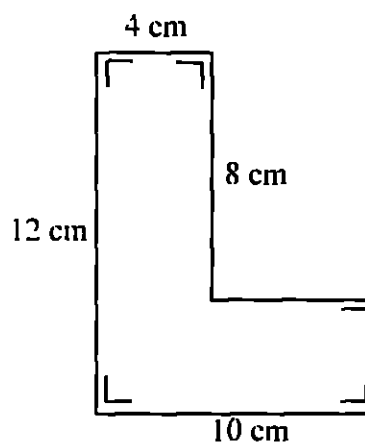
Att 2

Calculate

(i) the length of the perimeter

(ii) the area

of the shape in the diagram



Part (i)

10 marks

Att 3

$$\text{Perimeter} = 4 + 8 + 6 + 4 + 10 + 12 = 44 \text{ cm}$$

Blunders (-3)

B1 no addition

Slips (-1)

S1 each measurement omitted

S2 error in calculations

Attempts (3)

A1 copies given diagram

Worthless

W1 wrong answer without work

Part (ii)

5 marks

Att 2

$$\begin{aligned} \text{Area} &= (10 \times 4) + (8 \times 4) = 40 + 32 = 72 \text{ cm}^2 \\ \text{Or } \text{Area} &= (12 \times 4) + (6 \times 4) = 48 + 24 = 72 \text{ cm}^2 \end{aligned}$$

Blunders (-3)

B1 any area omitted

Slips (-1)

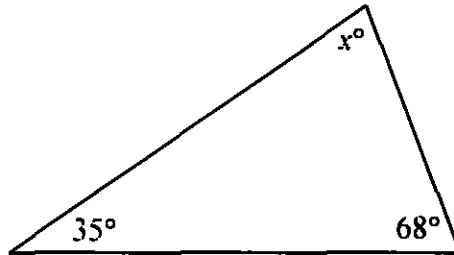
S1 error in calculations, once only

QUESTION 19

15 marks

Att 5

Find the value of x in the diagram



15 marks

Att 5

$$x^\circ = 180^\circ - (68^\circ + 35^\circ) = 180^\circ - 103^\circ = 77^\circ$$

Blunders (-3)

B1 takes sum of angles of a triangle to be 90 or 360 degrees

B2 adds 35 and 68 and stops

B2 subtracts one angle from 180 degrees

Slips (-1)

S1 error in calculations once only

Attempts (5)

A1 draws any triangle

A2 any work with 180 degrees

QUESTION 20

Part (i)	5 marks	Att 2
Part (ii)	5 marks	Att 2
Part (iii)	5 marks	Att 2

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

x	0	1	2	3
y	1			

(ii) Plot these four points on graph paper and join them to form a line

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

x	0	1	2	3
y	1			

Slips (-1)

S1 each incorrectly copied entry

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

x	0	1	2	3
y	1	3	5	7

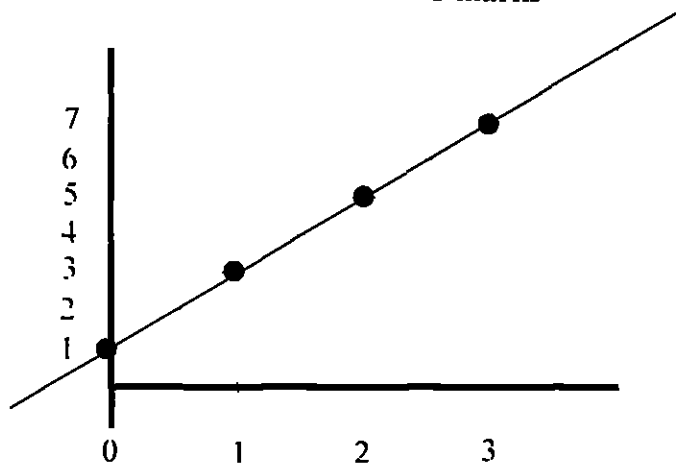
Blunders (-3)

B1 error in evaluating $2x$ for example 2×1 or $2 + 1$

Slips (-1)

S1 error in calculations, once only

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



Slips (-1)

S1 each incorrectly plotted point

S2 incorrect scale

S3 points not joined