## Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>GENERAL GUIDELINES FOR EXAMINERS – PAPER 1</td>
<td>2</td>
</tr>
<tr>
<td>QUESTION 1</td>
<td>3</td>
</tr>
<tr>
<td>QUESTION 2</td>
<td>13</td>
</tr>
<tr>
<td>QUESTION 3</td>
<td>18</td>
</tr>
<tr>
<td>QUESTION 4</td>
<td>24</td>
</tr>
<tr>
<td>QUESTION 5</td>
<td>28</td>
</tr>
<tr>
<td>QUESTION 6</td>
<td>31</td>
</tr>
<tr>
<td>QUESTION 7</td>
<td>34</td>
</tr>
<tr>
<td>GENERAL GUIDELINES FOR EXAMINERS – PAPER 2</td>
<td>38</td>
</tr>
<tr>
<td>QUESTION 1</td>
<td>39</td>
</tr>
<tr>
<td>QUESTION 2</td>
<td>41</td>
</tr>
<tr>
<td>QUESTION 3</td>
<td>43</td>
</tr>
<tr>
<td>QUESTION 4</td>
<td>45</td>
</tr>
<tr>
<td>QUESTION 5</td>
<td>47</td>
</tr>
<tr>
<td>QUESTION 6</td>
<td>50</td>
</tr>
<tr>
<td>QUESTION 7</td>
<td>52</td>
</tr>
<tr>
<td>QUESTION 8</td>
<td>55</td>
</tr>
<tr>
<td>MARCANNA BREISE AS UCHT FREAGAIRT TRÍ GHAELGE</td>
<td>58</td>
</tr>
</tbody>
</table>
GENERAL GUIDELINES FOR EXAMINERS – PAPER 1

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. Any examiner unsure of the validity of the approach adopted by a particular candidate to a particular question should contact his/her advising examiner.

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

Each Part (a) 10 marks Att 4

Part (i) 10 marks Att 4

Find \( \sqrt{246.8} \), correct to two decimal places.

(i) 10 marks Att 4

\[
(i) \quad \sqrt{246.8} = 15.70986951... = 15.71
\]

* Accept correct answer with no work.

Blunders (-3)

B1 \( \sqrt{2468} = [49.678969...] = 49.68 \).
B2 \( \sqrt{24.68} = [4.967896...] = 4.97 \).
B3 \( \sqrt{2.468} = [1.570986...] = 1.57 \).
B4 \( \sqrt{0.2468} = [0.496789...] = 0.50 \).
B5 Root other than square root indicated and correctly worked. \( \sqrt[3]{246.8} = 6.27 \).
B6 Incorrect or omitted rounding-off.

Misreadings (-1)

M1 \( \sqrt{248.6} = [15.767054...] = 15.77 \).
M2 \( \sqrt{262.8} = [20.659138...] = 20.66 \).

Attempts (4 marks)

A1 \( (246.8)^2 = 60910.24 \)
A2 \( 246.8/2 = 123.4 \).
A3 \( 246.8 \times 2 = 493.6 \).
A4 Work at estimating answer: \( \sqrt{246.8} = 16 \).
A5 Any effort at finding or estimating another root with work shown.
A6 An incorrect figure correctly rounded off, to two decimal places.
A7 Any other answers as B1, B2, B3 and B4 but with misplaced decimal point and no work shown.

Worthless (0 marks)

W1 Incorrect answers with no work, other than those in scheme.
Find the exact value of \( \frac{1}{(0.4)^2} - (1.7)^2 \).

\[
(ii) \quad \frac{1}{0.16} - 2.89 = 6.25 - 2.89 = 3.36. \text{ or } \frac{9}{25} \text{ or } \frac{84}{25}.
\]

* Accept correct answer with no work.

**Blunders (-3)**

B1 \( \frac{1}{(0.4)^2} - (17)^2 = 6.25 - 289 = -282.75 \).

B2 \( \frac{1}{4^2} - (1.7)^2 = 0.0625 - 2.89 = -2.8275 \).

B3 \( \frac{1}{(0.04)^2} - (17)^2 = 625 - 2.89 = 622.11 \).

B4 \( \frac{1}{(0.4)^2} - (0.17)^2 = 6.25 - 0.0289 = 6.2211 \).

B5 Only one Square evaluated. [–0.39 or 4.45 as answers]

B6 Reciprocal not found. [–2.73 as answer.]

B7 No subtraction.

B8 Error in precedence e.g. \( 1 - (1.7)^2 \div (0.4)^2 = -17.0625 \)

B9 \( \frac{1}{(0.40)^2} = -11.8125 \)

**Misreadings (-1)**

M1 \( \frac{1}{(0.4)^2} - (7.1)^2 = 6.25 - 50.41 = -44.16 \).

M2 Subtraction reversed to give 3.36.

**Slips (-1)**

S1 Numerical errors to a max of –3.

**Attempts (4 marks)**

A1 Work at estimating answer: e.g. .16 or 4.

A2 Any other answers as B1, B2, B3, and B4 but with misplaced decimal point and no work shown.

A3 No square evaluated.

**Worthless (0 marks)**

W1 Incorrect answers with no work, other than those in scheme.
Part (iii) 10 marks

Find \((7.91)^3\), correct to three decimal places.

| (iii) \((7.91)^3 = 494.913671... = 494.914\) |

* Accept correct answer with no work.

**Blunders (-3)**
B1 Incorrect or omitted rounding off.
B2 Power \((\in N)\) greater than 1 (other than 3) indicated and correctly worked.
B3 \((791)^3 = 494913671\)
B4 \((79.1)^3 = 494913.671\)
B5 \((0.791)^3 = 0.495\)

**Misreadings (-1)**
M1 \((7.19)^3 = 371.695\)

**Attempts (4 marks)**
A1 \(7.91 \times 3 = 23.73\) whether given correct to three decimal places or not.
A2 \(7.91/3 = 2.63666...\) whether given correct to three decimal places or not.
A3 \(\sqrt[3]{7.91} = 1.99247...\) whether given correct to to three decimal places or not.
A4 \(7.91 \times 10^3 = 7910\).
A5 Work at estimating answer: e.g. \((8)^3 = 512\).
A6 Any other answers as B2, B3, B4, and B5 but with misplaced decimal point and no work shown.
A7 An incorrect number correctly rounded off to three decimal places.

**Worthless (0 marks)**
W1 Incorrect answers with no work, other than those in scheme.
Part (iv) 10 marks  

(iv) Find the exact value of $14.2 - 2.7 \div 0.3$

\[
14.2 - 2.7 \div 0.3 = 14.2 - 9 = 5.2
\]

* Accept correct answer with no work.

Blunders (-3)

B1 Error in precedence: $11.5 \div 0.3 = 38.333333\ldots = 38\frac{1}{3} [38.3 \Rightarrow 7$ marks].

B2 Any step omitted.

B3 The use of a wrong operator or operators is indicated. (Once only)

B4 A different ordering of the numbers indicated and correctly worked out.

Misreadings (-1)

M1 A clear and obvious numerical misreading not involving the decimal point.

M2 Answer given as $-5.2$.

Attempts (4 marks)

A1 Work at estimating answer: e.g. $14 - 3 \div 0.3 = 4$ or $36.6666$.

A2 Work towards some correct step: e.g. division begun.

A3 $38$ only.

Worthless (0 marks)

W1 Incorrect answers with no work, other than those in scheme.
(v) Find 21·5% of €300.

\[
\frac{300 \times 21.5}{100} = \€64.5. \\
300 \times 0.215 = \€64.5.
\]

* Accept correct answer with no work.

* An answer of 1395.35 is found from 300 ÷ 21.5 followed by use of the percentage key ⇒ 7 marks.

* An answer of 13.95 is found from 300 ÷ 21.5 followed by use of the percentage key and then the “=” key ⇒ 4 marks.

* 6450 (no units) ⇒ 10 marks.

**Blunders (-3)**

B1 \[300 \times 1.215 = 364.5.\]

B2 \[300 \times 0.785 = 235.5.\]

B3 \[\frac{300 \times 21.5}{100} \text{ or } 300 \times 0.215 \text{ and stops.}\]

B4 Errors in establishing \[\frac{300 \times 21.5}{100}.\] [All three elements must be present otherwise attempt only]

**Attempts (4 marks)**

A1 Gets 1% (= 3) and stops.

**Worthless (0 marks)**

W1 \[300 \pm 21.5.\]
Part (vi) 10 marks

Find the value in euro of $240, given that €1 = $1.47. Give your answer correct to the nearest cent.

\[
\frac{240}{1.47} = 163.2653061\ldots = €163.27
\]

\[
\frac{240}{0.0147} = 16326.53061 = 16326.53\text{ cents} = €163.27.
\]

* Accept correct answer with no work.

* 16327 c ⇒ 9 marks.

Blunders (-3)

B1 \(240 \times 1.47 = 352.8\).

B2 \(\frac{1.47}{240} = 0.006125\).

B3 Incorrect or no rounding off.

B4 Division not finished or finished incorrectly.

Slips (-1)

S1 Answer given in cents.

Attempts (4 marks)

A1 Some use of the given data.

Worthless (0 marks)

W1 Incorrect answers with no work, other than those in scheme.
A train journey begins at 13:00 and finishes at 15:30.
The average speed of the train for this journey is 60 km per hour.
How far does the train travel?

(vii) Journey Time = 2hrs 30 min = 2.5 hrs
\[ s = \frac{d}{t} \Rightarrow d = s \times t \Rightarrow d = 60 \times 2.5 = 150 \text{ km}. \]

* Accept correct answer with no work.

Blunders (-3)

B1 Error in evaluation of journey time.
B2 Treating 2hrs 30 min as 2.3 hrs ⇒ 138 km as answer.
B3 Misuse of \( s = \frac{d}{t} \). e.g. \( 60 \div 2.5 = 24 \text{ km} \).
B4 \( 60 \times 2.5 \) and stops.

Slips (-1)
S1 Numerical errors to a max of −3.
S2 No units or incorrect units given.

Attempts (4 marks)
A1 Evaluation of journey time and stops.
A2 Some use of given data.
A3 \( s = \frac{d}{t} \) or \( d = s \times t \) written down and no more.

Worthless (0 marks)
W1 Incorrect answer with no work other than those in scheme.
Harry spent \( \frac{1}{3} \) of his money. He then had €15.60.

How much money did he start with?

\[
\text{(viii) } \frac{2}{3} = 15.60 \Rightarrow \frac{1}{3} = 7.8 \Rightarrow \frac{3}{3} = 23.4 \quad \text{or} \quad 7.8 + 15.6 = 23.4.
\]

* Accept correct answer with no work

Blunders (-3)

B1 \( \frac{1}{3} = 15.60 \Rightarrow \frac{3}{3} = 46.8. \)

B2 1 \( - \frac{1}{3} \) incorrect.

B3 7.8 and stops.

B4 15.6 \( \div 2 = 5.2 + 15.6 = 20.8 \) or \( 15.6 \div 3 = 5.2 \times 4 = 20.8. \)

Slips (-1)

S1 Numerical errors to a max – 3.

Attempts (4 marks)

A1 15.6/3 = 5.2 and stops.

A2 Some use of the given data.

Worthless (0 marks)

W1 Incorrect answer with no work.
Find \( \frac{(4.5 \times 10^6) - (5.8 \times 10^5)}{2.4 \times 10^3} \) correct to two significant figures.

\[
\begin{align*}
\text{(ix)} & \quad \frac{3.92 \times 10^6}{2.4 \times 10^3} = 1.63333333... \times 10^3 = 1633 = 1600. \\
& \quad \frac{4500000 - 580000}{2400} = \frac{3920000}{2400} = 1633.3333... = 1633 = 1600.
\end{align*}
\]

* Accept correct answer with no work.

**Blunders (-3)**

B1 Error in precedence.
B2 Each omitted or incorrect step if slips not clear.
B3 Misplaced decimal or wrong order of magnitude each time.
B4 Inverts final fraction giving 0.000612244... as answer.
B5 Any incorrect rounding off within the working. (Once only).
B6 The use of a wrong operator or operators is indicated. (Once only).
B7 \( \frac{3920000}{2400} \) and stops. [note B8]

**Slips (-1)**

S1 Numerical slips (to a max of – 3).
S2 Answer not correct to two significant figures.

**Attempts (4 marks)**

A1 \( 10^6 \) treated as 60, \( 10^5 \) treated as 50 and/or \( 10^3 \) treated as 30.
A2 Some work towards estimation.
A3 \( 10^6 \) as \( 10 \times 10 \times 10 \times 10 \times 10 \times 10 \), and/or likewise with \( 10^3 \) and \( 10^3 \).
A4 An incorrect number correctly rounded off to two significant figures.

**Worthless (0 marks)**

W1 Incorrect answer with no work shown, other than those in scheme.
Part (x) 10 marks Att 4

Find \( \frac{(38 \cdot 7)(15 \cdot 9)}{10 \cdot 2 - 4 \cdot 7} \), correct to the nearest integer

\[
\begin{align*}
\text{(x)} & \quad \frac{615 \cdot 33}{5 \cdot 5} = 111.8781818... = 112 \\
\end{align*}
\]

*Accept correct answer with no work.*

\* \( \frac{(38 \cdot 7)(15 \cdot 9)}{10 \cdot 2} \) \( - 4 \cdot 7 = 55 \cdot 626 = 56 \) \( \Rightarrow 7 \) marks.

Blunders (-3)

B1 Error(s) in precedence. (Once only)

B2 \( \frac{5 \cdot 5}{615 \cdot 33} = 0.008938293 = 0. \)

B3 The use of a wrong operator or operators is indicated. (Once only)

B4 Any step omitted e.g. \( 615 \cdot 33/5 \cdot 5 \) and stops. [Note B6]

B5 Any incorrect rounding off within the working. (Once only)

Slips (-1)

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

S2 Incorrect or no rounding off.

Misreadings (-1)

M1 Clear and obvious misreading not involving the decimal point.

Attempts (4 marks)

A1 Work at estimating answer.

A2 An incorrect number correctly rounded off to nearest integer.

Worthless (0 marks)

W1 Incorrect answer with no work shown, other than those in scheme.
QUESTION 2

<table>
<thead>
<tr>
<th>Part (a)</th>
<th>10 (5, 5) marks</th>
<th>Att (2, 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part (b)</td>
<td>20 (10, 5, 5) marks</td>
<td>Att (4, 2, 2)</td>
</tr>
<tr>
<td>Part (c)</td>
<td>20 (10, 5, 5) marks</td>
<td>Att (4, 2, 2)</td>
</tr>
</tbody>
</table>

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

(a) Change to metres

(i) 1.56 km

\(1.56 \times 1000 = 1560 = 1560 \text{ metres.}\)

(ii) 4900 mm

\(\frac{4900}{1000} = 4.9 = 4.9 \text{ metres.}\)

* Accept correct answer with no work.
* Accept answers given without units.

**Blunders (-3)**

B1 Incorrect conversion factor.

B2 Misuse of conversion factor: e.g. \(1.56 \div 1000 = 0.0015\).

B3 Misuse of conversion factor: e.g. \(4900 \times 1000 = 4900000\).

**Slips (-1)**

S1 Numerical errors.

S2 Answer given as 4 m 90 cm.

**Attempts (2 marks)**

A1 Use of given data [Covers both parts].

**Worthless (0 marks)**

W1 Incorrect answer with no work shown, other than those in scheme.
The following information was used to calculate the cost of gas used by a family:

- Previous meter reading: 125689
- Present meter reading: 127312
- First 700 units charged at: 4·5 cent per unit
- Remaining units charged at: 3·6 cent per unit.

(i) Calculate the number of units used between these two meter readings.
(ii) Calculate the cost of the first 700 units used.
(iii) Calculate the cost of all the units used between these two readings, correct to the nearest cent.

\[
\text{(b)(i) } \quad 127312 - 125689 = 1623
\]

* Accept correct answer without work.

**Blunders (-3)**
B1 \(127312 + 125689 = 253001\)

**Slips (-1)**
S1 \(125689 - 127312 = -1623\).
S2 Decimal error.
S3 Numerical errors to a max of –3.

**Attempts (4 marks)**
A1 Some use of the given data.

\[
\text{(b)(ii) } \quad 700 \times 4·5 = 3150 \text{ cent or } €31·50.
\]

* Accept correct answer without work.

**Blunders (-3)**
B1 Incorrect multiplier.

**Slips (-1)**
S1 Decimal error.
S2 Numerical errors to a max of –3.

**Attempts (2 marks)**
A1 Some use of the given data.
(b)(iii) 5 marks

Units @ 3·6 cent: 1623 − 700 = 923 units.
Cost of 700 units @ 4·5 cent per unit = 3150 cent.
Cost of 923 units @ 3·6 cent per unit = 3322·8 cent.
Total Cost = 3150 + 3322·8 = 6472·8 = 6473 cent or €64·73

* Accept correct answer without work.
* Accept candidate's answers from parts (i) and (ii).

Blunders (-3)
- B1 700 × 4·5 + 923 × 3·6 and stops.
- B2 Any error(s) in calculation of 700 × 4·5 + 923 × 3·6. (to a max −3)
- B3 Incorrect break up of 1623 units.
- B4 Incorrect multiplier e.g. 8·1.

Slips (-1)
- S1 Decimal error.
- S2 Numerical errors to a max of −3.

Attempts (2 marks)
- A1 1623 units not broken into 700 and additional units.
- A2 700 × 4·5 = 3150 and stops.
- A3 923 × 3·6 = 33322·8 and stops.
- A4 1623 = 700 + 923 and stops.
- A5 Some use of the given data.
Tom earns €650 per week and has tax credits of €78 per week.

(i) The rate of tax is 20%. How much tax does Tom pay per week?

(ii) Find his weekly take home pay.

(iii) What percentage of his total pay is paid in tax?

<table>
<thead>
<tr>
<th>(c)(i)</th>
<th>10 marks</th>
<th>Att 4</th>
</tr>
</thead>
</table>
| (c)(i) | Gross tax: \(650 \times 0.2 = 130\)  
Tax payable: \(130 - 78 = \text{€52}\) |       |

* Accept correct answer without work.  
* Part (ii) must be shown separately to earn marks for that section.

Blunders (-3)
- B1 Error in calculating %. e.g. \(650 \times 1.20\).
- B2 Adds tax credit to gross tax. (208).
- B3 €598 given as tax payable.
- B4 \(650 - 130 = 520 + 78 = 598 \Rightarrow 7\) marks for part (i)

Slips (-1)
- S1 Decimal error.
- S2 Numerical errors to a max of −3.

Attempts (4 marks)
- A1 Any mishandling or ignoring of the Tax Credit other than B2.
- A2 Some effort at getting %.

Worthless (0 marks)
- W1 Incorrect answer with no work shown, other than those in scheme.

<table>
<thead>
<tr>
<th>(c)(ii)</th>
<th>5 marks</th>
<th>Att 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>(c)(ii)</td>
<td>Take-home pay: (650 - 52 = \text{€598})</td>
<td></td>
</tr>
</tbody>
</table>

* Accept correct answer without work  
* Accept candidate’s answer from part (i).

Blunders (-3)
- B1 \(650 + 52 = 702\)
- B2 Uses wrong Gross wage.
- B3 Uses a Tax other than that calculated in (b) (i) above.
- B4 Subtraction not completed.

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

Attempts (2 marks)
- A1 Some spurious number subtracted from Gross wage

Worthless (0 marks)
- W1 Incorrect answer with no work shown, other than those in scheme.
(c)(iii) \[ \frac{52}{650} \times 100 = 8\% \]

* Accept correct answer without work.
* Accept candidate’s answer from part (i).

Blunders (-3)
B1 Errors in establishing \[ \frac{52}{650} \times 100 \] [All three elements must be present otherwise att only]
B2 Uses wrong Gross wage.
B3 Uses a Tax other than that calculated in (b) (i) above.

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

Attempts (2 marks)
A1 Some use of 100.

Worthless (0 marks)
W1 Incorrect answer with no work shown.
QUESTION 3

<table>
<thead>
<tr>
<th>Part (a)</th>
<th>10 (5, 5) marks</th>
<th>Att (2, 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part (b)</td>
<td>20 marks</td>
<td>Att 8</td>
</tr>
<tr>
<td>Part (c)</td>
<td>20 (10, 5, 5) marks</td>
<td>Att (4, 2, 2)</td>
</tr>
</tbody>
</table>

(a) A teacher estimates that a particular exam will take the students 1 hour to complete. The students actually finish the exam in 50 minutes.

(i) Find the error in the estimate given by the teacher.

(ii) Find the percentage error.

<table>
<thead>
<tr>
<th>(a)(i)</th>
<th>5 marks</th>
<th>Att 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i)</td>
<td>10 minutes</td>
<td></td>
</tr>
<tr>
<td>* Accept correct answer with no work.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Blunders (-3)
B1 60–50 and stops.
B2 50 − 1 = 49.

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

Attempts (2 marks)
A1 Some use of the given data.

Worthless (0 marks)
W1 Incorrect answer with no work shown, other than those in scheme.

<table>
<thead>
<tr>
<th>(a)(ii)</th>
<th>5 marks</th>
<th>Att 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>(ii) Percentage error = ( \frac{10}{50} \times 100 = 20% )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>* Accept correct answer with no work.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Blunders (-3)
B1 Error(s) in establishing \( \frac{10}{50} \times 100 \) [All three elements must be present; otherwise attempt only].
B2 Incorrect or incomplete answer or no answer. [Use candidate’s answer from Part (a) (i)].

Worthless (0 marks)
W1 Incorrect answer with no work shown, other than those in scheme.
Part (b) 20 (10, 5, 5) marks Att (4, 2, 2)

(b) €5200 is invested for four years at 2.5% per annum compound interest. What was the total value of the investment at the end of the four years, correct to the nearest cent.

(b) Substitute into formula 10 marks Att 4
Simplify bracket 5 marks Att 2
Finish 5 marks Att 2

\[
\begin{align*}
A &= 5200 \left(1 + \frac{2.5}{100}\right)^4 = 5200(1.025)^4 = 5200(1.103812891) = 5739.827033111 = \text{€5739.83}.
\end{align*}
\]

* Accept correct answer with no work.
* \(A = 5200 \left(1 + \frac{2.5}{100}\right)^4 \) \(\Rightarrow 10\) marks.
* \(A = 5200(1.025)^4 \) \(\Rightarrow 15\) marks.
* \(A = \text{€5739.83} \Rightarrow 20\) marks
* \(A = 5200 \left(1 + \frac{2.5}{100}\right)^4 \) = incorrect ans., no further work \(\Rightarrow 14\) marks. \((10 + 2 + 2)\)

Substitute into formula 10 marks Att 4

Blunders (-3)
B1 Error in formula as written by student or incorrect formula e.g. depreciation
B2 Error in substituting into formula, once only.

Attempts (4 marks)
A1 5200 / 2.5 = 2080
A2 (5200) (2.5) = 13000.
A3 5200 / 0.025 = 208000.

Simplify bracket 5 marks Att 2

B1 \(A = 5200 \left(1 + \frac{2.5}{100}\right)^4 \neq 5200(1.025)^4\).

Finish 5 marks Att 2

* Use candidate’s answer to simplification of \(A = 5200 \left(1 + \frac{2.5}{100}\right)^4\)

B1 \((1.025)^4 = (1.025) \times 4 = 4 \cdot 1\) or \((1.025)^4 = (1.025)/4 = 0.25625\)
B2 \(\frac{5200}{(1.025)^4} = 4828.716937...\) or \(\frac{5200}{(0.975)^4} = 5610.344072...\)
B3 5200 \(\times (0.975)^4 = 4699.177031\).

Slips (-1)
S1 Incorrect or omitted rounding off to nearest cent.
S2 Numerical error

Misreadings (-1)
M1 \((1.025)^n, n = 2 \text{ or } 3 \text{ or } n \geq 5 \text{ used in formula}\)

Worthless (0 marks)
W1 Incorrect answer with no work shown, other than those in scheme.
### OR

<table>
<thead>
<tr>
<th>(b) Amount year 1</th>
<th>5 marks</th>
<th>Att 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount year 2</td>
<td>5 marks</td>
<td>Att 2</td>
</tr>
<tr>
<td>Amount year 3</td>
<td>5 marks</td>
<td>Att 2</td>
</tr>
<tr>
<td>Amount year 4</td>
<td>5 marks</td>
<td>Att 2</td>
</tr>
</tbody>
</table>

| (b) | Amount at end of year 1: \(5200 \times 1.025 = 5330\)  
|      | Amount at end of year 2: \(5330 \times 1.025 = 5463.25\)  
|      | Amount at end of year 3: \(5463.25 \times 1.025 = 5599.83125\)  
|      | Amount at end of year 4: \(5599.83125 \times 1.025 = 5739.827031 \approx \€5739.83\)  |

|            | Compound Interest Year 1: \(5200 \times \frac{2.5}{100} = 130 \Rightarrow \text{Principal Yr 2} = 5330\)  
|            | Compound Interest Year 2: \(5300 \times \frac{2.5}{100} = 133.5 \Rightarrow \text{Principal Yr 3} = 5463.25\)  
|            | Compound Interest Year 3: \(5463.25 \times \frac{2.5}{100} = 136.58125 \Rightarrow \text{Principal Yr 4} = 5599.83125\)  
|            | Compound Interest Year 4: \(5599.83125 \times \frac{2.5}{100} = 139.995733\)  
|            | \(\Rightarrow \text{Amount} = 5739.827031 \approx \€5739.83\)  |

\* Accept correct answer with no work.
\* Amount year 1 = 5330 \Rightarrow 5 marks
\* Amount year 2 = 5463.25 \Rightarrow 10 marks
\* Amount year 3 = 5599.83125 \Rightarrow 15 marks
\* Amount year 4 = \€5739.83 \Rightarrow 20 marks
\* No effort at compounding \Rightarrow 0 marks

### Amount at end of year 1 5 marks Att 2

**Blunders (-3)**

- **B1** \(5200 \times 1.25 = 6500\).
- **B2** Error(s) in establishing \(\frac{5200 \times 2.5}{100}\) [All three elements must be present; else attempt only]
- **B3** Stops at interest and fails to find amount.
- **B4** Subtracts interest to find amount.

**Slips (-1)**

- **S1** Numerical errors. (to a max of \(-3\)).

**Attempts (2 marks)**

- **A1** Some use of 100 in attempt to find percentage.

**Worthless (0 marks)**

- **W1** Incorrect answer with no work shown, other than those in scheme
Amount at end of year 2  5 marks  Att 2
* Use candidate’s answer for amount at end of year 1

Blunders (-3)
B1 Error(s) in calculating percentage.
B2 Uses a principal other than calculated above.
B3 Stops at interest and fails to find amount.
B4 Subtracts interest to find amount. Do not penalise if B4 above in Year 1.

Slips (-1)
S1 Numerical errors. (to a max of $-3$.)
S2 Incorrect or omitted rounding off.

Worthless (0 marks)
W1 No effort at compounding.
W2 Incorrect answer with no work shown, other than those in scheme.

Amount at end of year 3  5 marks  Att 2
* Use candidate’s answer for amount at end of year 2.

Blunders (-3)
B1 Error(s) in calculating percentage.
B2 Uses a principal other than calculated above.
B3 Stops at interest and fails to find amount.
B4 Subtracts interest to find amount. Do not penalise if B4 in Year 1 or Year 2

Slips (-1)
S1 Numerical errors. (to a max of $-3$.)
S2 Incorrect or omitted rounding off.

Worthless (0 marks)
W1 No effort at compounding.
W2 Incorrect answer with no work shown, other than those in scheme.

Amount at end of year 4  5 marks  Att 2
* Use candidate’s answer for amount at end of year 3.

Blunders (-3)
B1 Error(s) in calculating percentage.
B2 Uses a principal other than calculated above.
B3 Stops at interest and fails to find amount.
B4 Subtracts interest to find amount. Do not penalise if B4 in Year 1 or Year 2

Slips (-1)
S1 Numerical errors. (to a max of $-3$.)
S2 Incorrect or omitted rounding off.

Worthless (0 marks)
W1 No effort at compounding.
W2 Incorrect answer with no work shown, other than those in scheme.
Part (c) 20(10, 5, 5) marks Att (4, 2, 2)

(c) Susan is 10 years old and Jane is 14 years old. A sum of money is divided between them in the ratio of their ages. Susan gets €50.

(i) How much money will Jane get?

(ii) How much money is divided between them?

In one year’s time the sum of money to be divided will be increased by €114. This sum of money will be divided between them in the ratio of their ages at that time.

(iii) How much will each person get next year?

Part(c)(i) 10 marks Att 4

<table>
<thead>
<tr>
<th>(c)(i)</th>
<th>10:14</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>24</td>
<td>12</td>
</tr>
</tbody>
</table>

⇒ \[ \frac{10}{24} = 5 \]

⇒ \[ \frac{1}{24} = 5 \]

⇒ \[ \frac{14}{24} = 70 \text{ (Jane's Share)} \]

120 – 50 = 70

\[ 10x : 14x \Rightarrow 10x = 50 \]

\[ \Rightarrow x = 5 \]

\[ \Rightarrow 14x = 70 \]

\[ \Rightarrow \text{Jane’s Share} = 70 \]

*Accept correct answer with no work.

* 10 : 24 = 5 : 12

* 120 ⇒ 7 marks but part (ii) must be shown separately to earn marks for that section.

Blunders (-3)

B1 Divisor ≠ 10 or 5 only and continues.

B2 Incorrect multiplier or fails to multiply. (Each time).

B3 Error in transposition.

B5 Addition instead of subtraction e.g. 120 + 50 = 170.

Attempts (4 marks)

A1 Divisor ≠ 10 or 5 e.g. 50/24 and stops.

A2 Indicates 24 parts or 10 parts or 14 parts or \( \frac{10}{24} \) or \( \frac{14}{24} \) or \( 10 + 14 = 24 \) and stops.

A3 Indicates multiplication of 50 by 10 and or 14 and stops.

Worthless (0 marks)

W1 Incorrect answer with no work shown, other than those in scheme.
(c)(ii) 5 marks

\[
50 + 70 = 120 \quad \frac{1}{24} = 5 \Rightarrow \frac{24}{24} = 120
\]

* Accept correct answer with no work.
* Accept candidate’s answer from part (i).

**Blunders (-3)**

B1 Divisor \(\neq 10\) or \(5\) only and continues.
B2 Incorrect multiplier or fails to multiply.
B3 Error in transposition. [Note \(x\)-method above]
B5 subtraction instead of addition e.g. \(70 - 50 = 20\).

**Attempts (4 marks)**

A1 Divisor \(\neq 10\) or \(5\) e.g. \(50/24\) and stops.
A2 Indicates 24 parts or 10 parts or 14 parts or \(\frac{10}{24}\) or \(\frac{14}{24}\) or \(10 + 14 = 24\) and stops.
A3 Indicates multiplication of 50 by 10 and or 14 and stops.

**Worthless (0 marks)**

W1 Incorrect answer with no work shown.

---

(c)(iii) 5 marks

\[
\text{New sum of money} = 120 + 114 = 234 \quad \text{New Ratio: } 11 : 15
\]

\[
\frac{234}{26} = 9 \quad \Rightarrow \text{Susan's Share} = 99 \quad \text{and Jane's Share} = 135
\]

* Accept correct answer with no work.
* Accept candidate’s answer from part (i) and part (ii)

**Blunders (-3)**

B1 Subtraction instead of addition e.g. \(120 - 114 = 6\) i.e. incorrect new sum of money
B2 Incorrect new ratio.
B3 Divisor \(\neq 26\) only and continues.
B4 Incorrect multiplier or fails to multiply.
B5 Error in transposition. [Note \(x\)-method above part (c)(i)].

**Slips (-1)**

S1 Numerical errors to a max of –3.

**Attempts (2 marks)**

A1 Divisor \(\neq 26\) e.g. \(234/24\) and stops.
A2 Indicates 26 parts or 11 parts or 15 parts or \(\frac{11}{26}\) or \(\frac{15}{26}\) or \(11 + 15 = 26\) and stops.
A3 Indicates multiplication of 114 by 11 and or 15 and stops.

**Worthless (0 marks)**

W1 Incorrect answer with no work shown.
QUESTION 4

Part (a) 10 marks Att 4

(a) Solve for $x$

\[2x + 7 = 5x - 5\]

\[2x - 5x + 7 = 5x - 5 - 5x\]
\[\Rightarrow -3x + 7 = -5\]
\[\Rightarrow -3x = -12\] [7 marks]
\[\Rightarrow x = 4.\]

\[7 + 5 = 5x - 2x \Rightarrow 12 = 3x\] [7 marks] \[\Rightarrow 4 = x.\]

* Award full marks for a correct answer by T + E with verification.

Blunders (-3)
B1 Blunders in grouping terms e.g. $2x + 7 = 9x$. (Each time).
B2 Transposition error(s). (Once only).
B3 \[-3x = -12 \Rightarrow x \neq 4\] or $12 = 3x \Rightarrow x \neq 4$
B4 Each step omitted e.g. $-3x = -12$ and stops
B5 $x = 4$ without work.

Slips (-1)
S1 Numerical errors.

Attempts (4 marks)
A1 Some correct work.
A2 Effort at T+E by substitution.

Worthless (0 marks)
W1 Incorrect answer without work.
Part (b) 20 (15, 5) marks  

**Solve the simultaneous equations**

\[
7x - y = 11 \\
4x + 3y = 17.
\]

**First variable found** 15 marks  
**Second variable** 5 marks

<table>
<thead>
<tr>
<th>First Variable</th>
<th>Second Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>7x - y = 11</td>
<td>4x + 3y = 17</td>
</tr>
<tr>
<td>21x - 3y = 33</td>
<td>4x + 3y = 17</td>
</tr>
<tr>
<td>25x = 50</td>
<td>14 - y = 11</td>
</tr>
<tr>
<td>x = 2</td>
<td>3 = y</td>
</tr>
</tbody>
</table>

* Random x picked, y calculated (or vice-versa) – award 5 marks (second variable found).
* Substitution of correct values in both equations and verification shown – Award 15 + 5 marks.

**Blunders (-3)**

B1 Error(s) in establishing the first equation in terms of x only [25x = 50] or the first equation terms of y only [−25y = −75.]
B2 Blunder in substitution e.g. y value for x.
B3 25x = 50 ⇒ x ≠ 2.

**Attempts**

- **First variable** – (6 marks)
  A1 Effort at equalising coefficients of x’s or y’s.
  A2 Effort at cancelling one variable.
  A3 Effort at writing x in terms of y (or vice-versa).

- **Second variable** – (2 marks)
  A4 Effort at substituting first variable.
  A5 Effort at cancelling second variable.

**Attempts** (6+2 marks)

A6 Attempt at finding a solution by T + E.
A7 Correct answers with no work shown.

**Worthless** (0 marks)

W1 Incorrect answer(s), no work shown.
John cycles to school in \( x \) minutes. Mark gets the bus to school and takes 10 minutes longer. Brendan walks to school and takes twice as long as Mark.

(i) Express the time taken by Brendan to get to school in terms of \( x \).

When the times taken by the three boys to get to school are added, the total is 90 minutes.

(ii) Write this information as an equation in terms of \( x \).

(iii) Find how long it took John to get to school.

\[
\begin{align*}
\text{(c) (i) } &\quad \text{John} = x \text{ min. } \Rightarrow \text{Mark} = x + 10 \text{ min} \Rightarrow \text{Brendan} = 2(x + 10) [10 \text{ marks}] = 2x + 20 \\
\text{(c) (ii) } &\quad x + x + 10 + 2x + 20 = 90 \quad \text{or} \quad 4x + 30 = 90
\end{align*}
\]

Attempts (4 marks)

A1 Some use of the given data e.g. \( \frac{x}{10}, \frac{10}{x}, 10x - 2 \).

Worthless (0 marks)

W1 No use of \( x \) or 10.

\[
\begin{align*}
\text{(c) (iii) } &\quad x + x + 10 + 2x + 20 = 90 \quad \text{or} \quad 4x + 30 = 90
\end{align*}
\]
(c) (iii) 5 marks

\[ x + x + 10 + 2x + 20 = 90 \Rightarrow 4x + 30 = 90 \Rightarrow 4x = 60 \Rightarrow x = 15. \]

* Accept candidate's answer from part (i) and part (ii).
* 4x + 30 or 4x + 30 = 90 as starting work can earn marks for parts (i) and (ii).

Blunders (-3)
B1 Incorrectly formed equation.
B2 Blunders in grouping terms e.g. 4x + 30 = 34x. (Each time).
B3 Transposition error(s). (Once only).
B4 4x = 60 \Rightarrow x \neq 15.
B4 Each step omitted.

Slips(-1)
S1 Numerical errors.

Attempts (2 marks)
A1 Some correct work.
A2 Effort at T+E by substitution.

Worthless (0 marks)
W1 Incorrect answer without work.
QUESTION 5

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

**Part (a)**

(a)(i) Write down all the prime numbers between 1 and 10.

(a)(ii) How many of these prime numbers are factors of 21?

<table>
<thead>
<tr>
<th>(a)</th>
<th>(i)</th>
<th>5 marks</th>
<th>Att 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a)</td>
<td>(i)</td>
<td>2, 3, 5, 7.</td>
<td></td>
</tr>
<tr>
<td>(a)</td>
<td>(ii)</td>
<td>2 [3, 7]</td>
<td></td>
</tr>
</tbody>
</table>

**Part (a)(i)**

Slips (-1)

S1 Each omitted or incorrect entry provided at least one is correct. (to a max of −3)

Attempts (2 marks)

A1 At least one correct entry.

**Part (a)(ii)**

Hit or miss. Accept “2” or “3 and 7”.

**Part (b)**

(b)(i) Solve the quadratic equation \(x^2 - 5x - 36 = 0\).

(b)(ii) Solve the quadratic equation \(x^2 - 7x + 8 = 0\).

Give your answers correct to one decimal place.

<table>
<thead>
<tr>
<th>b</th>
<th>10 marks</th>
<th>Att 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>(b)</td>
<td>(i)</td>
<td>(x^2 - 5x - 36 = 0 \Rightarrow (x - 9)(x + 4) = 0) [7 marks] (\Rightarrow x = 9, x = -4)</td>
</tr>
</tbody>
</table>

Blunders(-3)

B1 Last step(s) omitted.
B2 Sign error(s) in factors (Once only).
B3 Sign error(s) in solution (Once only)).
B4 Incorrect relevant factors and continues.
B5 Errors in using formula as in (ii).

Attempts(4 marks)

A1 Effort at finding factors.
A2 Attempt at T + E.

Worthless (0 marks)

W1 Quadratic reduced to linear.

* without work:

2 correct answers, both verified: full marks
2 correct answer and one verified: \(1 \times B (-3)\)
2 correct answers, neither verified: Att 4 marks
1 correct answer, and verified: Att 4 marks
1 correct answer but not verified: 0 marks

Page 28
(b) (ii)  

\[ x^2 - 7x + 8 = 0 \Rightarrow x = \frac{7 \pm \sqrt{(-7)^2 - 4(1)(8)}}{2} = \frac{7 \pm \sqrt{49 - 32}}{2} = \frac{7 \pm \sqrt{17}}{2} \]

\[ x = \frac{7 \pm 4 \cdot 1.23}{2} = 5.5615 \text{ or } 1.4385 \Rightarrow x = 5.6 \text{ or } x = 1.4 \]

* Maximum deductions beyond point * is 3 marks.

\[
\frac{7 \pm \sqrt{\text{negative no.}}}{2}
\]

cannot earn final 3 marks.

**Blunders (-3)**

B1 Blunder in application of formula.

**Slips (-1)**

S1 Slips in substitution into the formula (to a max of −5).

S2 \(49 + 32 = 81\).

S3 Incorrect or omitted rounding off, each time.

**Attempts (4 marks)**

A1 Effort at substitution into formula.

A2 Incorrect formula with substitution.

A3 Attempt at finding factors e.g. \((x - \_)(x - \_)\).

A4 Appearance of the variable in the answer.

**Worthless (0 marks)**

W1 Quadratic reduced to linear.

---

**Part (c) 20 (10, 5, 5) marks**

(c) (i) Solve \(3x - 4 < 8, x \in \mathbb{Z}\).

(ii) Solve \(12 - 2x \leq 16, x \in \mathbb{Z}\).

(iii) Write down the values of \(x\) which satisfy both of the above inequalities?

---

(c)(i) 10 marks

(i) \(3x - 4 < 8 \Rightarrow 3x < 12 \Rightarrow x < 4\)

* Listing not required.

**Blunders (-3)**

B1 Blunders in grouping terms e.g. \(3x - 4 = -x\). (Each time).

B2 Transposition error(s). (Once only).

B3 Each step omitted.

B4 \(x < 4\) without work.

B5 Replaces inequality sign with equality sign.

**Misreadings (-1)**

M1 Uses \(\leq\) for <.
Attempts (4 marks)
A1 Some correct work.
A2 Effort at T+E by substitution.

Worthless (0 marks)
W1 Incorrect answer without work.

\[
\begin{array}{|c|c|}
\hline
\text{(c)(ii)} & 5 \text{ marks} & \text{Att 2} \\
\hline
\text{(ii)} & 12 - 2x \leq 16 & \Rightarrow -4 \leq 2x \Rightarrow -2 \leq x \\
\hline
\end{array}
\]

* Listing not required.

Blunders (-3)
B1 Blunders in grouping terms e.g. 12 - 2x = 10x. (Each time).
B2 Transposition error(s). (Once only).
B3 Blunder in direction of inequality when multiplying by “minus”.
B4 Each step omitted.
B5 \( x \geq -2 \) without work.
B6 Replaces \( \leq \) with equality sign. Do not penalise if B5 is incurred in (i).

Misreadings (-1)
M1 Uses < for \( \leq \).

Attempts (2 marks)
A1 Some correct work.
A2 Effort at T+E by substitution.
A3 12 + 2x \leq 16.

Worthless (0 marks)
W1 Incorrect answer without work.

\[
\begin{array}{|c|c|}
\hline
\text{(c)(iii)} & 5 \text{ marks} & \text{Att 2} \\
\hline
\text{(iii)} & -2 -1, \ 0 \ 1, \ 2, \ 3 \\
\hline
\end{array}
\]

* Accept candidate’s answers from part (i) and part (ii).
* If equality used in (i) and (ii), then attempt mark at most here.

Slips(-1)
S1 Each omitted or incorrect entry, provided at least one is correct. (to a max of \(-3\))

Attempts (2 marks)
A1 At least one correct entry.
QUESTION 6

The graph shows a record of the amount of money spent by a student on fruit on each day of the week. For example on Wednesday the amount spent was €3.

(i) How much did the student spend on Saturday?
(ii) On which two days was the same amount spent?
(iii) What was the difference between the amounts spent on Wednesday and on Friday?
(iv) What was the average amount spent per day during this week, correct to the nearest cent?
(v) Express the amount spent on Wednesday as a percentage of the total spent on Monday, Tuesday and Saturday.

(i) 10 mark  

(i) 1·5

Blunders (−3)
B1 0·75.
B2 3 as answer as a result of scalar misreading.

Worthless (0 marks)
W1 Incorrect answer without work, other than those in the scheme.
(ii) 10 marks

<table>
<thead>
<tr>
<th>(ii)</th>
<th>Tuesday and Friday</th>
</tr>
</thead>
</table>

**Blunders (−3)**

B1 Only one of the correct days given

**Worthless (0 marks)**

W1 Incorrect answers with no work.

(iii) 10 marks

<table>
<thead>
<tr>
<th>(iii)</th>
<th>3 − 2 = 1</th>
</tr>
</thead>
</table>

* Accept correct answer without work.

**Blunders (−3)**

B1 Each incorrect amount. [do not penalise scalar misreading if the same as error in part (i).]

B2 1·5 − 1 = 0·5. [See S1]

B3 3 + 2 = 5.

B4 6 − 4 = 2 [do not penalise scalar misreading if the same as error in part (i).]

**Worthless (0 marks)**

W1 Incorrect answers with no work, other than those in

**Attempts(2 Marks)**

A1 Only one value.
(iv) 10 marks Att 4

| 4.5 + 2.5 + 2 + 3 + 1 + 2 + 1.5 = 16.5 ⇒ 16.5/7 = 2.36. |

* Accept correct answer without work.

Blunders (−3)

B1 Calculating the sum of half the values. [do not penalise scalar misreading if the same as error in a previous part]
B2 Stops at 16.5/7.
B3 2, the mode given as average.
B4 Scalar Error [do not penalise scalar misreading if the same as error in a previous part] i.e. $\frac{33}{7}$.

Slips (−1)

S1 Each omitted amount, or incorrect amount, provided at least one is correct.
S2 Uses a divisor other than 7.
S3 Numerical errors. (to a max of −3)

Attempts (4 Marks)

A1 Stops at 16.5 or candidates answer.

Worthy (0 marks)

W1 Incorrect answers with no work, other than those in scheme.

(v) 10 marks Att 4

| \[ \frac{3}{2.5 + 2 + 1.5} \times 100 = \frac{3}{6} \times 100 = 50\% \] |

* Accept correct answer without work.

Blunders (−3)

B1 Errors in establishing $\frac{3}{2.5 + 2 + 1.5} \times 100$ [all three elements must be present; else att only]

Slips (−1)

S1 Numerical errors.
S2 Each omitted amount, or incorrect amount, provided at least one is correct. (to a max −3)

Attempts (4 marks)

A1 Some effort at finding totals.

Worthy (0 marks)

W1 Incorrect answers with no work, other than those in scheme.
7. Draw the graph of the function \( f(x) = 2x^2 - 4x - 5 \), for \(-2 \leq x \leq 4\), \( x \in \mathbb{R} \).

\[
\begin{array}{|c|c|c|c|c|c|c|c|}
\hline
x & -2 & -1 & 0 & 1 & 2 & 3 & 4 \\
\hline
2x^2 & 8 & 2 & 0 & 2 & 8 & 18 & 32 \\
-4x & 8 & 4 & 0 & -4 & -8 & -12 & -16 \\
-5 & -5 & -5 & -5 & -5 & -5 & -5 & -5 \\
f(x) & 11 & 1 & -5 & -7 & -5 & 1 & 11 \\
\hline
\end{array}
\]

* Accept correct \( f(x) \) values without work.

**Blunders (-3)**
B1 \( x \)-values added on when calculating \( f(x) \) values.
B2 Consistent errors across full line.
Otherwise slips applied.
B3 \( f(x) \) not evaluated for an \( x \)-value in domain or some \( x \) value omitted.

**Misreadings (-1)**
M1 \(-5\) treated as 5 across the line.

**Slips (-1)**
S1 Each incorrect or omitted value in body of table.
S2 Each incorrect or omitted \( y / f(x) \) value, calculated from candidate’s work.

**Attempt (8 marks)**
A1 Any four correct calculated values in the table.
A2 Function treated as linear e.g. \( x^2 = 2x \) or \( x \) or \( 2x^2 = 4x \) or \( x \).

OR
Function evaluation method 20 marks

| f(-2) = 2(-2)^2 - 4(-2) - 5 = 11 |
| f(-1) = 2(-1)^2 - 4(-1) - 5 = 1 |
| f(0) = 2(0)^2 - 4(0) - 5 = -5 |
| f(1) = 2(1)^2 - 4(1) - 5 = -7 |
| f(2) = 2(2)^2 - 4(2) - 5 = -5 |
| f(3) = 2(3)^2 - 4(3) - 5 = 1 |
| f(4) = 2(4)^2 - 4(4) - 5 = 11 |

Blunders (-3)
B1 Consistent errors in the evaluation of $2x^2$.
B2 $-5$ omitted from the evaluation.
B3 Each incorrect $f(x)$ value when no work is shown to a max of 3(–3) provided that at least one $f(x)$ value is correct. All $f(x)$ values incorrect without work ⇒ 0 marks. Otherwise slips applied when work is shown.

Misreadings (-1)
M1 $-5$ consistently treated as 5 in the evaluation.

Slips (-1)
S1 Each incorrect or omitted value from the evaluation after substitution.
S2 Each incorrect or omitted $f(x)$ value, calculated from candidate’s work.
* Accept values from candidate’s table.
* Fully correct graph drawn with no work shown: Award 30 marks.

**Blunders (-3)**

B1 Points joined in incorrect order.
B2 Blunders in scales on axis or axes. (Once only.)

**Slips (-1)**

S1 Each point, from table, plotted incorrectly.
S2 Each pair of successive points not joined, to maximum –3.
S3 Not a smooth curve.
S4 The graph of the function is not in the conventional position or orientation.

**Attempts (4 marks)**

A1 At least two of candidate’s points plotted.
A2 Any ∪-shaped graph.
A3 Axes Drawn.
Use your graph to estimate

(i) Write down the minimum value of \( f(x) \)
(ii) What are the values of \( x \) for which \( f(x) = 3 \)?
(iii) For what range of values of \( x \) is \( f(x) \) increasing?
(iv) Draw the axis of symmetry of the graph.

<table>
<thead>
<tr>
<th>Part (i)</th>
<th>5 marks</th>
<th>Att 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part (ii)</td>
<td>5 marks</td>
<td>Att 2</td>
</tr>
<tr>
<td>Part (iii)</td>
<td>5 marks</td>
<td>Att 2</td>
</tr>
<tr>
<td>Part (iv)</td>
<td>5 marks</td>
<td>Att 2</td>
</tr>
</tbody>
</table>

(i) -7
(ii) 3.2 and -1.2
(iii) \( 1 < x \leq 4 \) or \( x > 1 \).
(iv) On graph

* Accept candidate’s values from graph.
* Allow tolerance ± 0.3 units on x-axis, ± 0.5 units on y-axis.
* Accept (1, -7) in part (i) for 5 marks.

**Blunders (-3)**
B1 Value omitted, or extra value. Applies in part (ii).
B2 \( f(x) = 3 \) treated as \( f(3) \)

**Misreading (-1)**
M1 Gives the value of \( x \) corresponding to the minimum of \( f(x) \) in part (i).

**Slips(-1)**
S1 Answers indicated correctly on axes, but not specified.
S2 Increasing part of graph indicated but no \( x \) values written down.

**Attempt (2 marks)**
A1 Effort at reading value(s) from graph.
A2 Correctly solving equation algebraically: part (ii).
A3 Any vertical line on graph, applies to axis of symmetry.
LEAVING CERTIFICATE 2009

MARKING SCHEME

MATHEMATICS - PAPER 2

FOUNDATION LEVEL
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) 15 (10, 5) marks
Part (b) 35 (30, 5) marks

Part (a) 15 (10, 5) marks
Att (4, 2)

1. (a) The perimeter of a rectangular field is 280 m. The length of the longer side is 100 m. Find
   (i) the length of the shorter side,
   (ii) the area of the field.

(a) (i) 10 marks
(a) (ii) 5 marks

| (a) (i) | 10 marks | Att 4 |
| (a) (ii) | 5 marks | Att 2 |

(i) \[ b = \frac{(\text{Length} - 2a)}{2} = \frac{280 - 200}{2} = \frac{80}{2} = 40m \]

(ii) \[ Area = ab = 100 \times 40 = 4000m^2 \]

Blunders (-3)
B1 Incorrect substitution
B2 Failure to divide by 2

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

Attempts (4, 2)
A1 Defines length or area
(b) The diagram shows a garden.

Offsets of lengths 3, 7, 9, 10, 12 and 11 metres are measured at intervals of 4 m as shown.

(i) Use Simpson’s rule to estimate the area of the garden.

(ii) A flower bed takes up 25% of the area of the garden.
    Calculate the area of this flower bed.

\[
\text{Area} = \frac{1}{3} \times \text{width} \left[ \text{First} + \text{last} + 2(\text{odd}) + 4(\text{even}) \right]
\]

(i) \[\text{Area} = \frac{4}{3} \left[ 0 + 11 + 2(7 + 10) + 4(3 + 9 + 12) \right] = \frac{4}{3} \left[ 11 + 34 + 96 \right] = \frac{4}{3} \times 141 = 188 m^2\]

(ii) \[\text{Area} = 188 \times \frac{25}{100} = 47 m^2\]

\textit{Blunders (-3)}

B1 Uses four odd and twice even e.g. 2(24) + 4(17)
B2 Omits 2 or 4 in the formula or both
B3 Omits h or uses an incorrect h or does not divide h by 3
B4 Error in percentage calculation

\textit{Slips (-1)}

S1 Numerical errors to a max of 3
S2 Each incorrect or omitted altitude

\textit{Attempts (12, 2)}

A1 Gives Simpson’s formula only.
A2 Copies diagram
2. (a) The diagram shows a cone with a height of 5 cm and of base radius 4 cm. Calculate the volume of this cone. Give your answer correct to the nearest whole number.

\[
Volume = \frac{\pi r^2 h}{3} = \frac{\pi \times 4^2 \times 5}{3} = 83.77 \approx 84 \text{ cm}^3
\]

- Blunders (-3)
  - B1 Incorrect substitution

- Slips (-1)
  - S1 Numerical errors to a max of 3
  - S2 Error in rounding or gives answer in terms of \(\pi\)

- Attempts (8)
  - A1 Correct formula without substitution
  - A2 Copies diagram
The length of the diameter of the empty cylinder in the diagram is 12 cm and the height is 10 cm.

(i) Calculate the volume of the cylinder in terms of $\pi$.

A volume of $288\pi$ cm$^3$ of liquid is poured into this cylinder.

(ii) Calculate the height of the liquid in the cylinder.

(iii) What percentage of the total volume of the cylinder has no liquid in it?

\[
\text{(i)} \quad \text{Volume} = \pi r^2 h = \pi (6)^2 (10) = 360\pi \text{ cm}^3
\]

\[
\text{(ii)} \quad \pi \times 6^2 \times h = 288\pi \Rightarrow h = \frac{288\pi}{36\pi} = 8 \text{ cm}
\]

\[
\text{(iii)} \quad \text{No liquid volume} = 360\pi - 288\pi = 72\pi \Rightarrow \% = \frac{72\pi}{360\pi} \times 100 = 20\%
\]

**Blunders (-3)**

B1 Incorrect substitution
B2 Error in balancing equation
B3 Error in percentage calculation

**Slips (-1)**

S1 Numerical errors to a max of 3
S2 Omits $\pi$ or gives answer as 1130.97 or 1130.4 or similar
S3 Answer 80%

**Attempts (6, 2, 4)**

A1 Correct formula without substitution
**QUESTION 3**

<table>
<thead>
<tr>
<th>Part (a)</th>
<th>10 marks</th>
<th>Att 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part (b)</td>
<td>20 (5, 5, 5, 5) marks</td>
<td>Att (2, 2, 2, 2)</td>
</tr>
<tr>
<td>Part (c)</td>
<td>20 (10, 5, 5) marks</td>
<td>Att (4, 2, 2)</td>
</tr>
</tbody>
</table>

### Part (a) 10 marks Att 4

In the triangle $\triangle abc$, $ac = bc$ and $\angle acb = 70^\circ$. Calculate $\angle cbd$.

![Diagram of triangle with labels a, b, c, d and angles marked]

**Ans:** $125^\circ$

**Blunders (-3)**
- B1 Geometrical error

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

**Attempts (4)**
- A1 Incorrect answer of some merit
- A2 Oversimplifies

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

$P$ and $Q$ are parallel lines. Find:

- (i) the measure of the angle $A$
- (ii) the measure of the angle $B$
- (iii) the measure of the angle $C$
- (iv) the measure of the angle $D$.

![Diagram of parallel lines P and Q with angles A, B, C, D marked]

**Ans** (i) $45^\circ$ (ii) $140^\circ$ (iii) $95^\circ$ (iv) $135^\circ$

**Blunders (-3)**
- B1 Geometrical error

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

**Attempts (2, 2, 2, 2)**
- A1 Incorrect answer of some merit
The diagram shows a circle with centre at \( o \). \([dc]\) and \([ab]\) are diameters. 
\[\angle dob = 100^\circ\] and \( |ob| = 6 \text{ cm} \).

(i) Write down \( \angle aeb \).

(ii) Calculate \( \angle oad \).

(iii) Find \( |dc| \).

<table>
<thead>
<tr>
<th>Part (c)</th>
<th>20(10, 5, 5) marks</th>
<th>Att(4, 2, 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i) 90^\circ</td>
<td>(ii) 50^\circ</td>
<td>(iii) 12 cm</td>
</tr>
</tbody>
</table>

**Blunders (-3)**

B1 Geometrical error

**Slips (-1)**

S1 Numerical errors to a max of 3
S2 Omits units

**Attempts (4, 2, 2)**

A1 Incorrect answer of some merit
QUESTION 4

Part (a) 10 marks

Part (b) 30 (15, 10, 5) marks

Part (c) 10 marks

Part (a) 10 marks

\[ p(6, 3) \text{ and } q(-2, 4) \text{ are two points.} \]

Find the length of \[ pq \]

(i) \[ \text{Length} = \sqrt{(-2 - 6)^2 + (4 - 3)^2} = \sqrt{(-8)^2 + (1)^2} = \sqrt{65} \]

Blunders (-3)

B1 No square root
B2 Incorrect substitution once only
B3 Mathematical error

Slips (-1)

S1 Numerical errors to a max of 3

Attempts (4)

A1 Draws axes.

Part (b) 30 (15, 10, 5) marks

\( a \) is the point \((4, -3)\) and \( b \) is the point \((-5, 1)\).

(i) Plot the points \( a \) and \( b \) on graph paper.

(ii) Find the slope of \( ab \).

(iii) Find the equation of the line \( ab \).

\[(i) \quad 15 \text{ marks} \quad \text{Att 6} \]

\[(ii) \quad 10 \text{ marks} \quad \text{Att 4} \]

\[(iii) \quad 5 \text{ marks} \quad \text{Att 2} \]

Blunders (-3)

B1 Error in scales
B2 Each point omitted
B3 Incorrect substitution once only
B4 Mathematical error

Slips (-1)

S1 Numerical errors to a max of 3
S2 Each incorrectly plotted point

Attempts (6, 4, 2)

A1 Draws axes.
The line $K$ has equation $y = 4x + 2$.
The point $c$ has co-ordinates $(1, h)$.

(i) If $c$ lies on the line $K$, find the value of $h$.
(ii) Find the slope of $K$.
(iii) Find the equation of the line $M$, which passes through the point $(3, -2)$ and is perpendicular to $K$.

\[ \begin{align*}
(i) & \quad y = 4x + 2 \Rightarrow h = 4(1) + 2 \Rightarrow h = 6 \\
(ii) & \quad \text{slope} = 4 \\
(iii) & \quad y + 2 = -\frac{1}{4}(x - 3) \text{ or } x + 4y + 5 = 0
\end{align*} \]

*Penalise to a maximum of 1 blunder in each section*

**Blunders (-3)**
- B1 Incorrect substitution once only
- B2 Error in balancing equation
- B3 Incorrect slope of $K$
- B4 Incorrect slope of $M$

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

**Attempts (4)**
- A1 Draws axes.
The diagram shows a right angled triangle with sides of length 5, 12 and 13 cm and angles named $A$ and $B$.

Write as a fraction

(i) \[ \sin A = \frac{12}{13} \]

(ii) \[ \tan B = \frac{5}{12} \]
A vertical pole \( tr \) stands on level ground, as shown.

When the angle of elevation of the sun from \( p \) is 48°, the pole casts a shadow of length 1.5 m.

Calculate the height of the pole.
Give your answer correct to one place of decimals.

\[
\frac{h}{1.5} = \tan 48^\circ \quad \Rightarrow \quad h = 1.5 \tan 48^\circ \quad \Rightarrow \quad h = 1.66 \approx 1.7 m
\]

**Blunders (-3)**
B1 Incorrect trig ratio
B2 Error in balancing equation

**Slips (-1)**
S1 Fails to round off
S2 Numerical errors to a max of 3
S3 Wrong mode

**Attempts (6)**
A1 Measures from diagram
A2 Evaluates \( \sin 48^\circ \), \( \cos 48^\circ \), or \( \tan 48^\circ \) and stops

Wrong mode
Rad: \( h = 1.8 \)
Grad: \( h = 1.408 \approx 1.4 \)
Part (c) 15 (10, 5) marks  Att (4, 2)

(i) Find the length of the side $h$ in the diagram.

(ii) Find the measure of the angle $A$.
     Give your answer to the nearest degree.

\[ h = \sqrt{2^2 + 3^2} \Rightarrow h = \sqrt{13} \text{ or } 3.6 \]

\[ \tan A = \frac{3}{2} \Rightarrow A = \tan^{-1}\left(\frac{3}{2}\right) \Rightarrow A = 56.309^\circ \approx 56^\circ \]

**Blunders (-3)**
B1 Any error in Pythagoras
B2 Incorrect trig ratio
B3 Error in balancing equation

**Slips (-1)**
S1 Fails to round off
S2 Wrong mode

**Attempts (4, 2)**
A1 Measures from diagram.
QUESTION 6

Part (a) 10 marks  Att 4
Photographs can be developed in large, medium or small sizes. They can be in black and white or in
colour and they can have a glossy finish or a matt finish.
In how many different ways can photographs be developed?

(a) 10 marks  Att 4
Ans: \(3 \times 2 \times 2\) or 12

Blunders (-3)
B1 3 + 2 + 2 = 7 or 7 written down
B2 3! Etc

Misreadings (-1)
M1 Answer 3\(\times\)3\(\times\)2 = 18 or 18

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

Attempts (4)
A1 Incorrect answer of some merit

Part (b) 20 (5, 5, 5, 5) marks  Att (2, 2, 2, 2)
A bag contains 3 red, 2 green and 6 blue marbles.
A marble is selected at random from the bag.

What is the probability that the marble is
(i) red
(ii) green
(iii) blue or green
(iv) not blue?

Each part 5 marks  Att 2
Ans: (i) \(\frac{3}{11}\) (ii) \(\frac{2}{11}\) (iii) \(\frac{8}{11}\) (iv) \(\frac{5}{11}\)

Blunders (-1)
B1 Incorrect #(S) apply once only
B2 Incorrect #(E)
B3 Inverted fraction
B4 No division

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

Attempts (2, 2, 2, 2)
A1 Incorrect answer of some merit

Answers: (i) 3 (ii) 2 (iii) 8 (iv) 5 merits 17 marks
or
Answers: (i) \(\frac{1}{3}\) (ii) \(\frac{1}{2}\) (iii) \(\frac{1}{8}\) (iv) \(\frac{1}{5}\) merits 17 marks
80 students were asked what their favourite sport was. The results are given in the following table.

<table>
<thead>
<tr>
<th>Basketball</th>
<th>Football</th>
<th>Gymnastics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boys</td>
<td>10</td>
<td>21</td>
</tr>
<tr>
<td>Girls</td>
<td>16</td>
<td>12</td>
</tr>
</tbody>
</table>

A student is selected at random. Find the probability that the student is

(i) a boy
(ii) a girl who likes basketball
(iii) a student who likes football
(iv) a student who likes basketball or gymnastics.

Each part

<table>
<thead>
<tr>
<th>Ans: (i) ( \frac{39}{80} ) (ii) ( \frac{16}{80} ) (iii) ( \frac{33}{80} ) (iv) ( \frac{47}{80} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Each part</td>
</tr>
</tbody>
</table>

Blunders (-1)
B1 Incorrect #(S) apply once only.
B2 Incorrect #(E)
B3 Inverted fraction
B4 No division

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

Attempts (2, 2, 2, 2)
A1 Incorrect answer of some merit
QUESTION 7

Part (a) 5 marks Att 2

The table below is a record of the duration, in minutes, of 50 telephone calls.

<table>
<thead>
<tr>
<th>Duration in minutes</th>
<th>0 – 5</th>
<th>5 – 10</th>
<th>10 – 20</th>
<th>20 – 25</th>
<th>25 – 30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of calls</td>
<td>4</td>
<td>8</td>
<td>28</td>
<td>4</td>
<td>6</td>
</tr>
</tbody>
</table>

[Note: 5 – 10 means 5 minutes or more but less than 10 minutes, etc.]

Illustrate this data on a histogram. Put the duration in minutes on the horizontal axis.

(a) 5 marks Att 2

Blunders (-3)
B1 Error in scales, one blunder
B2 Draws trend graph
B3 Ignores proportion of 10 – 20 interval

Slips (-1)
S1 Each incorrect height
S2 Reverses axes

Attempts (2)
A1 Draws axes only
A shopkeeper recorded the amount of money spent by 40 students during lunch time on a certain day. The cumulative frequency table below shows the results.

<table>
<thead>
<tr>
<th>Amount spent in €</th>
<th>≤2</th>
<th>≤4</th>
<th>≤6</th>
<th>≤8</th>
<th>≤10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of students</td>
<td>10</td>
<td>18</td>
<td>28</td>
<td>35</td>
<td>40</td>
</tr>
</tbody>
</table>

Draw the cumulative frequency curve. 
Put the number of students on the vertical axis.

Use your cumulative frequency curve to estimate
(i) the median amount of money spent by the students.
(ii) the number of students who spent more than €7.

(b) Ogive 15 marks

Blunders (-3)
B1 Error in scales, one blunder
B2 Points not joined

Slips (-1)
S1 Each incorrectly plotted point
S2 Reverses axes
S3 Joins points with straight lines.

Attempts (6)
A1 Draws axes only

Tolerance ± 2
(b) (i) 5 marks Att 2
(ii) 5 marks Att 2

<table>
<thead>
<tr>
<th>Ans:</th>
<th>(i) €4.40</th>
<th>(ii) 40 – 33 = 7</th>
</tr>
</thead>
</table>

Blunders (-3)
B1 Uses wrong axis for median.

Slips (-1)
S1 Median not specified
S2 Fails to subtract reading in (ii)

Part (c) 20 (15, 5) marks Att (6, 2)

(i) Find the mean of the numbers 2, 4, 7, 8, 9.
(ii) Find the standard deviation of the numbers 2, 4, 7, 8, 9, correct to two decimal places.

(i) Mean \[ \frac{\sum x}{n} = \frac{2 + 4 + 7 + 8 + 9}{5} = \frac{30}{5} = 6 \]

(ii) Standard Deviation \[ \sqrt{\frac{\sum d^2}{n}} = \sqrt{\frac{(2 - 6)^2 + (4 - 6)^2 + (7 - 6)^2 + (8 - 6)^2 + (9 - 6)^2}{5}} = \sqrt{\frac{9}{5}} = \sqrt{\frac{34}{5}} \approx 2.61 \]

Blunders (-3)
B1 Incorrect substitution

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

Attempts (6, 2)
A1 Any addition
A2 Work on SD or defines SD
Part (a) 10 marks Att 4

(a) Construct a parallelogram $abcd$ where $|ab| = 8\text{ cm}$, $\angle abc = 130^\circ$ and $|bc| = 5\text{ cm}$.

Blunders (-3)
B1 Each omitted side.
B2 Incorrect angle ± 5°

Slips (-1)
S1 Each side outside tolerance of ± 1 cm
part (b) 20 (5, 5, 5, 5) marks att (2, 2, 2, 2)

(b) The triangle $ors$ is the image of the triangle $otu$ under an enlargement, centre $o$.
$|rs| = 10 \text{ cm and } |tu| = 5 \text{ cm.}$

(i) Find the scale factor of the enlargement.

(ii) $|or| = 12 \text{ cm, find } |ot|.$

(iii) The area of the triangle $ors$ is 60 cm$^2$, find the area of the triangle $otu$.

(iv) Write down the area of the region $rsut$.

Each part 5 marks att 2

(i) \[ \text{Scale factor } = \frac{10}{5} \text{ or } 2 \]

(ii) \[ |ot| = \frac{12}{2} = 6 \text{ cm} \]

(iii) \[ \text{Area } = \frac{60}{2^2} = 15 \text{ cm}^2 \text{ or Area } = 3 \times 5 = 15 \text{ cm}^2 \]

(iv) \[ \text{Area } rsut = 60 - 15 = 45 \text{ cm}^2 \]

Blunders (-3)
B1 Incorrect scale factor
B2 Error in area formula
B3 Does not square scale factor

Misreadings (-1)
M1 Treats out as image triangle

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

Attempts (2, 2, 2, 2)
A1 Incorrect answer of some merit
(c) Construct any square in your answer book. Draw all the axes of symmetry of this square.

**Blunders (-3)**
- B1 Each omitted side.
- B2 Axes greater than 4
- B3 Incorrect angle
- B4 Four sides not equal

**Slips (-1)**
- S1 Each symmetry omitted.

**Attempts (4, 4)**
- A1 No axes of symmetry drawn
MARCANNA BREISE AS UCHT FREAGAIRT TRÍ GHAELGE

(Bonus marks for answering through Irish)

Ba chóir marcanna de réir an ghnáthráta a bhronadh ar iarrthóirí nach ngnóthaíonn níos mó ná 75% d’iomlán na marcanna don pháipéar. Ba chóir freisin an marc bónais sin a shlánú síos.

Déantar an cinneadh agus an ríomhaireacht faoin marc bónais i gcás gach páipéar ar leithligh.

Is é 5% an gnáthráta agus is é 300 iomlán na marcanna don pháipéar. Mar sin, bain úsáid as an gnáthráta 5% i gcás iarrthóirí a ghnóthaíonn 225 marc nó níos lú, e.g. 198 marc × 5% = 9·9 ⇒ bónas = 9 marc.

Má ghnóthaíonn an t-iarrthóir níos mó ná 225 marc, ríomhtar an bónas de réir na foirmle [300 – bunmharc] × 15%, agus an marc bónais sin a shlánú síos. In ionad an ríomhaireachtaí sin a dhéanamh, is féidir úsáid a bhaint as an tábla thíos.

<table>
<thead>
<tr>
<th>Bunmharc</th>
<th>Marc Bónais</th>
</tr>
</thead>
<tbody>
<tr>
<td>226</td>
<td>11</td>
</tr>
<tr>
<td>227 – 233</td>
<td>10</td>
</tr>
<tr>
<td>234 – 240</td>
<td>9</td>
</tr>
<tr>
<td>241 – 246</td>
<td>8</td>
</tr>
<tr>
<td>247 – 253</td>
<td>7</td>
</tr>
<tr>
<td>254 – 260</td>
<td>6</td>
</tr>
<tr>
<td>261 – 266</td>
<td>5</td>
</tr>
<tr>
<td>267 – 273</td>
<td>4</td>
</tr>
<tr>
<td>274 – 280</td>
<td>3</td>
</tr>
<tr>
<td>281 – 286</td>
<td>2</td>
</tr>
<tr>
<td>287 – 293</td>
<td>1</td>
</tr>
<tr>
<td>294 – 300</td>
<td>0</td>
</tr>
</tbody>
</table>