



Coimisiún na Scrúduithe Stáit
State Examinations Commission

Leaving Certificate Applied 2017

Marking Scheme

Mathematical Applications

Common Level

Note to teachers and students on the use of published marking schemes

Marking schemes published by the State Examinations Commission are not intended to be standalone documents. They are an essential resource for examiners who receive training in the correct interpretation and application of the scheme. This training involves, among other things, marking samples of student work and discussing the marks awarded, so as to clarify the correct application of the scheme. The work of examiners is subsequently monitored by Advising Examiners to ensure consistent and accurate application of the marking scheme. This process is overseen by the Chief Examiner, usually assisted by a Chief Advising Examiner. The Chief Examiner is the final authority regarding whether or not the marking scheme has been correctly applied to any piece of candidate work.

Marking schemes are working documents. While a draft marking scheme is prepared in advance of the examination, the scheme is not finalised until examiners have applied it to candidates' work and the feedback from all examiners has been collated and considered in light of the full range of responses of candidates, the overall level of difficulty of the examination and the need to maintain consistency in standards from year to year. This published document contains the finalised scheme, as it was applied to all candidates' work.

In the case of marking schemes that include model solutions or answers, it should be noted that these are not intended to be exhaustive. Variations and alternatives may also be acceptable. Examiners must consider all answers on their merits, and will have consulted with their Advising Examiners when in doubt.

Future Marking Schemes

Assumptions about future marking schemes on the basis of past schemes should be avoided. While the underlying assessment principles remain the same, the details of the marking of a particular type of question may change in the context of the contribution of that question to the overall examination in a given year. The Chief Examiner in any given year has the responsibility to determine how best to ensure the fair and accurate assessment of candidates' work and to ensure consistency in the standard of the assessment from year to year. Accordingly, aspects of the structure, detail and application of the marking scheme for a particular examination are subject to change from one year to the next without notice.

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Structure of the marking scheme

Candidate responses are marked according to different scales, depending on the types of response anticipated. Scales labelled A divide candidate responses into two categories (correct and incorrect). Scales labelled B divide responses into three categories (correct, partially correct, and incorrect), and so on. The scales and the marks that they generate are summarised in this table:

| Scale label | A | B | C | D | E |
|------------------|------|----------|--------------|-----------------|--------------------|
| No of categories | 2 | 3 | 4 | 5 | 6 |
| 5-mark scale | 0, 5 | 0, 3, 5 | 0, 3, 4, 5 | | |
| 10-mark scale | | 0, 7, 10 | 0, 5, 8, 10 | 0, 4, 6, 8, 10 | |
| 15-mark scale | | | 0, 5, 10, 15 | 0, 5, 9, 12, 15 | 0, 3, 6, 9, 12, 15 |

A general descriptor of each point on each scale is given below. More specific directions in relation to interpreting the scales in the context of each question are given in the scheme, where necessary.

Marking scales – level descriptors

A-scales (two categories)

- incorrect response (no credit)
- correct response (full credit)

B-scales (three categories)

- response of no substantial merit (no credit)
- partially correct response (partial credit)
- correct response (full credit)

C-scales (four categories)

- response of no substantial merit (no credit)
- response with some merit (low partial credit)
- almost correct response (high partial credit)
- correct response (full credit)

D-scales (five categories)

- response of no substantial merit (no credit)
- response with some merit (low partial credit)
- response about half-right (mid partial credit)
- almost correct response (high partial credit)
- correct response (full credit)

E-scales (six categories)

- response of no substantial merit (no credit)
- response with some merit (low partial credit)
- response just under half-right (low mid partial credit)
- response just over half-right (high mid partial credit)
- almost correct response (high partial credit)
- correct response (full credit)

In certain cases, typically involving incorrect rounding, omission of units, or a misreading that does not oversimplify the work, a mark that is one mark below the full-credit mark may be awarded. This level of credit is referred to as *Full Credit –1*. Thus, for example, in Scale 10C, *Full Credit –1* of 9 marks may be awarded.

The only marks that may be awarded for a question are those on the scale above, or *Full Credit –1*.

In general, accept a candidate's work in one part of a question for use in subsequent parts of the question, unless this oversimplifies the work involved.

Summary of mark allocations and scales to be applied

| Question 1 | Question 2 | Question 3 | Question 4 | Question 5 |
|------------|------------|--------------|--------------|-----------------|
| (a) 5B | (a) 10C | (a)(i) 10B | (a) 5C | (a)(i) 10D |
| (b) 5B | (b) 5B | (a)(ii) 5C | (b) 10B | (a)(ii) 5B |
| (c) 5B | (c) 10C | (a)(iii) 10B | (c) 10C | (b)(i),(ii) 15D |
| (d) 5B | (d) 10C | (b) 10C | (d) 10C | (c) 15C |
| (e) 5C | (e) 10C | (c) 10B | (e), (f) 15E | (d) 5C |
| (f) 5B | (f) 5A | (d) 5C | | |
| (g) 5B | | | | |
| (h) 5B | | | | |
| (i) 5B | | | | |
| (j) 5C | | | | |

Model Solutions & Marking Notes

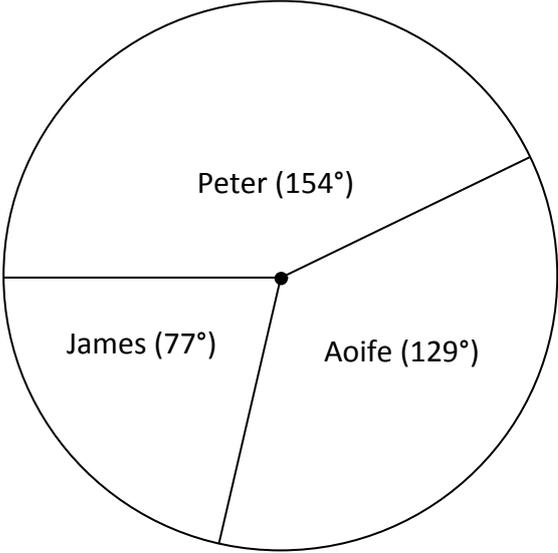
The model solutions for each question are not intended to be exhaustive – there may be other correct solutions. Any Examiner unsure of the validity of the approach adopted by a particular candidate to a particular question should contact his / her Advising Examiner.

| Q1 | Model Solution – 50 Marks | Marking Notes |
|-----|---|---|
| (a) | $24.67 + 23.89 + 123.54$ $= €172.10$ | <p>Scale 5B (0, 3, 5) Accept correct answer without work. Accept answer in euro without unit.</p> <p>Partial Credit</p> <ul style="list-style-type: none"> Some relevant calculation, for example: one amount omitted ($24.67 + 23.89 = € 48.56$); or multiplies cheques ($€72810.3127$); or subtracts cheques ($-€122.76$) Decimal point misplaced, otherwise correct <p>No Credit</p> <ul style="list-style-type: none"> Answer = one of the cheques <p>Full Credit –1</p> <ul style="list-style-type: none"> Correct answer in cent, but with no unit. |
| (b) | $350 \div 25 = 14$ doses | <p>Scale 5B (0, 3, 5) Accept correct answer without work.</p> <p>Partial Credit</p> <ul style="list-style-type: none"> Some relevant calculation, for example: $350 \times 25 = 8750$; or $350 \pm 25 = 375$ or 325 |
| (c) | $\frac{1}{6}$ or 0.1666 ... or equivalent | <p>Scale 5B (0, 3, 5) Accept correct answer without work.</p> <p>Partial Credit</p> <ul style="list-style-type: none"> Some use of 1 or 6 |
| (d) | $\sqrt{68} = 8.246$ $= 8.25$ [2 D.P.] | <p>Scale 5B (0, 3, 5) Accept correct answer without work.</p> <p>Partial Credit</p> <ul style="list-style-type: none"> Squares 68 (= 4624) Evaluates half 68 (= 34) Answer = $68 \times 2 = 136$ Decimal point misplaced, otherwise correct Answer = $2\sqrt{17}$ <p>Full Credit –1</p> <ul style="list-style-type: none"> Incorrect or no rounding, otherwise correct. |

| Q1 | Model Solution – 50 Marks | Marking Notes |
|-----|---|--|
| (e) | <p>Offer A is better value</p> <p><i>Calculations:</i></p> $€8 \div 6 = €1.33 \text{ [per bottle]}$ $€14 \div 10 = €1.40 \text{ [per bottle]}$ <p style="text-align: center;">OR</p> $6 \div 8 = 0.75 \text{ [bottles per €]}$ $10 \div 14 = 0.71 \dots \text{ [bottles per €]}$ <p style="text-align: center;">OR</p> $(8 \div 6) \times 10 = €13.33 \dots$ <p>[for 10 bottles of Offer A]</p> <p style="text-align: center;"><i>or any other valid justification</i></p> | <p>Scale 5C (0, 3,4, 5)</p> <p>Must have some relevant calculation(s) done to be awarded <i>Full Credit</i></p> <p>Low Partial Credit</p> <ul style="list-style-type: none"> • Correct answer • Some relevant calculation <p>High Partial Credit</p> <ul style="list-style-type: none"> • Correct answer and some relevant calculation • Complete relevant calculations (but no or incorrect answer) |
| (f) | $4 \times 4 \times 4 = 64 \text{ cm}^3$ | <p>Scale 5B (0, 3, 5)</p> <p>Accept correct answer without work.</p> <p>Partial Credit</p> <ul style="list-style-type: none"> • Some relevant calculation • Any use of 4 <p>Full Credit –1</p> <ul style="list-style-type: none"> • Correct answer with no or incorrect unit. |
| (g) | $645 - (65 \cdot 54 + 25 \cdot 80 + 21 \cdot 88)$ $= 645 - 113.22$ $= €531.78$ | <p>Scale 5B (0, 3, 5)</p> <p>Accept correct answer in euro without units.</p> <p>Accept correct answer without work</p> <p>Partial Credit</p> <ul style="list-style-type: none"> • Some relevant calculation, for example: calculates 113.22; or 645 minus any of amounts given • Decimal point misplaced, otherwise correct <p>Full Credit –1</p> <ul style="list-style-type: none"> • Correct answer in cent, but with no unit |
| (h) | $24 \times 7 \times 3 = 504 \text{ hours}$ | <p>Scale 5B (0, 3, 5)</p> <p>Accept correct answer without work.</p> <p>Accept correct answer without units.</p> <p>Partial Credit</p> <ul style="list-style-type: none"> • Some relevant calculation, for example: calculates 1 week = $24 \times 7 = 168$ hours • Uses working week of 40 or 39 or 38 hours, or Monday to Friday, when calculating |

| Q1 | Model Solution – 50 Marks | Marking Notes |
|-----|--|--|
| (i) | $X = 90^\circ$ $Y = 180 - (90 + 20)$ $= 180 - 110$ $= 70^\circ$ | <p>Scale 5B (0, 3, 5)</p> <p>Accept correct answer without work. Accept correct answer without units.</p> <p>Partial Credit</p> <ul style="list-style-type: none"> • One angle correct • Refers to right angle or 180° in a triangle • Some relevant calculation <p>Full Credit –1</p> <ul style="list-style-type: none"> • Correct answers presented in incorrect boxes |
| (j) | $= \frac{157+183+173+169+168}{5}$ $= \frac{850}{5} = 170 \text{ cm}$ | <p>Scale 5C (0, 3, 4, 5)</p> <p>Accept correct answer without units.</p> <p>No Credit</p> <ul style="list-style-type: none"> • Multiplies heights only • Answer = 5 • Any of the listed numbers with no work <p>Low Partial Credit</p> <ul style="list-style-type: none"> • Some relevant calculation, for example: divides one of the heights by 5; or error using calculator and get answer of 715.6 • Finds median (169) • Evidence of addition <p>High Partial Credit</p> <ul style="list-style-type: none"> • Finds sum of heights (850) |

| Q2 | Model Solution – 50 Marks | Marking Notes | | | | | | | | | |
|-------|---|--|-------|-------|---|---|---|-----|-----|-----|---|
| (a) | <p style="text-align: center;">Total Poll = 18 Spoiled or Blank = 4</p> | <p>Scale 10C (0, 5, 8, 10) Accept correct answers without work. Accept 16 and 2 (i.e. takes Total poll as all marked votes)</p> <p>Low Partial Credit</p> <ul style="list-style-type: none"> Shows understanding of relevant terms <p>High Partial Credit</p> <ul style="list-style-type: none"> Total Poll or Number of Spoiled or Blank Votes correct | | | | | | | | | |
| (b) | $\frac{14}{1+1} + 1 = 7 + 1 = 8 \text{ votes}$ | <p>Scale 5B (0, 3, 5)</p> <p>Partial Credit</p> <ul style="list-style-type: none"> Some correct substitution into the formula Some correct work with formula | | | | | | | | | |
| (c) | <table style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <tr> <td style="padding: 5px;">Peter</td> <td style="padding: 5px;">Aoife</td> <td style="padding: 5px;">James</td> </tr> <tr> <td style="padding: 5px; text-align: center;">6</td> <td style="padding: 5px; text-align: center;">5</td> <td style="padding: 5px; text-align: center;">3</td> </tr> <tr> <td style="padding: 5px; text-align: center;">43%</td> <td style="padding: 5px; text-align: center;">36%</td> <td style="padding: 5px; text-align: center;">21%</td> </tr> </table> <p style="margin-left: 20px;">Peter: $\frac{6}{14} \times 100 = 42.8574 = 43\%$</p> <p style="margin-left: 20px;">Aoife: $100 - (43 + 21)$ $= 100 - 64 = 36\%$</p> <p style="margin-left: 20px;">Or $5/14 \times 100 = 35.714 = 36\%$</p> | Peter | Aoife | James | 6 | 5 | 3 | 43% | 36% | 21% | <p>Scale 10C (0, 5, 8, 10) Accept correct answer without work. Accept correct percentages without percentage sign (i.e. accept 43 and 36)</p> <p>Low Partial Credit</p> <ul style="list-style-type: none"> Any correct number of votes Any correct percentage Number of votes = 7 and 6 (include spoiled votes) <p>High Partial Credit</p> <ul style="list-style-type: none"> One number of votes and one percentage correct. Uses 16 or 18 as total valid poll for percentage calculation, otherwise correct Number of votes = 7 and 6 and calculates one correct percentage <p>Full Credit –1</p> <ul style="list-style-type: none"> Incorrect or no rounding, otherwise correct Correct answers presented in incorrect boxes |
| Peter | Aoife | James | | | | | | | | | |
| 6 | 5 | 3 | | | | | | | | | |
| 43% | 36% | 21% | | | | | | | | | |

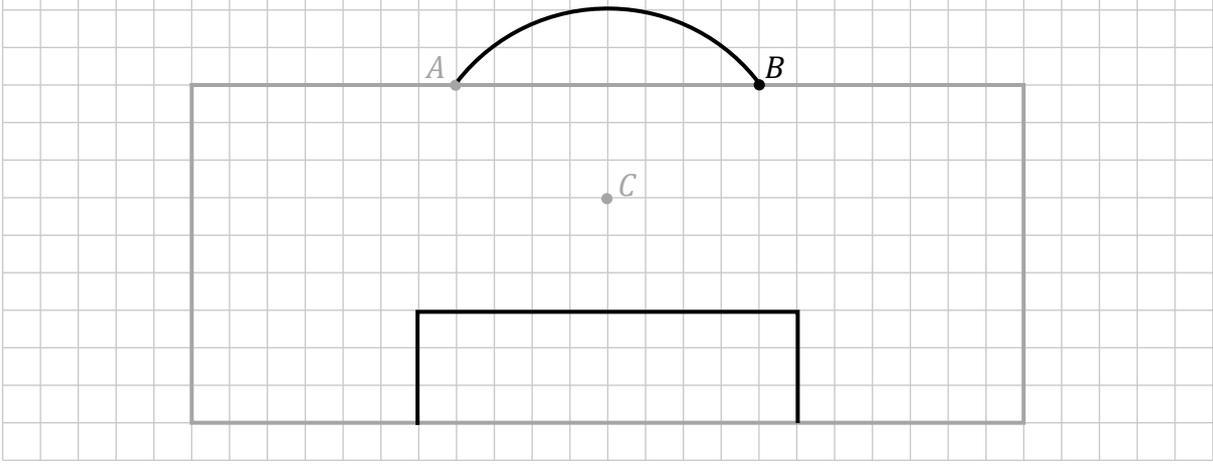
| Q2 | Model Solution – 50 Marks | Marking Notes | | | | | | | | | | | | |
|-------|---|---|-------|-------|-------|-------|---|---|---|-------|---|---|---|---|
| (d) |  <p><i>Calculations:</i></p> $\frac{6}{14} \times 360 = 154^\circ \text{ [nearest degree]}$ $\frac{5}{14} \times 360 = 129^\circ \text{ [nearest degree]}$ $\frac{3}{14} \times 360 = 77^\circ \text{ [nearest degree]}$ | <p>Scale 10C (0, 5, 8, 10)</p> <p>Note: calculations needed for two sectors for <i>Full Credit</i>.</p> <p>Accept degrees worked out using % from (c) (154.8°, 129.6°, 75.6°)</p> <p>Tolerance: $\pm 3^\circ$</p> <p>Low Partial Credit</p> <ul style="list-style-type: none"> Any correct line drawn from the centre to the circumference. Any relevant calculation. One correct sector drawn within tolerance with no calculations <p>High Partial Credit</p> <ul style="list-style-type: none"> One correct angle calculated and drawn correctly. Two angles correctly calculated. Pie chart correctly drawn with no calculations. Calculations correct but 3 angles drawn outside tolerance. <p>Full Credit –1</p> <ul style="list-style-type: none"> Sectors not labelled, otherwise correct. | | | | | | | | | | | | |
| (e) | <table border="1" data-bbox="268 1178 820 1312"> <thead> <tr> <th></th> <th>1st C</th> <th>Trans</th> <th>2nd C</th> </tr> </thead> <tbody> <tr> <td>Peter</td> <td>6</td> <td>2</td> <td>8</td> </tr> <tr> <td>Aoife</td> <td>5</td> <td>0</td> <td>5</td> </tr> </tbody> </table> | | 1st C | Trans | 2nd C | Peter | 6 | 2 | 8 | Aoife | 5 | 0 | 5 | <p>Scale 10C (0, 5, 8, 10)</p> <p>Low Partial Credit</p> <ul style="list-style-type: none"> 1 figure correct. <p>High Partial Credit</p> <ul style="list-style-type: none"> 3 figures correct. |
| | 1st C | Trans | 2nd C | | | | | | | | | | | |
| Peter | 6 | 2 | 8 | | | | | | | | | | | |
| Aoife | 5 | 0 | 5 | | | | | | | | | | | |
| (f) | <p>A non-transferable vote is a vote that cannot be transferred to another candidate as part of a surplus or after an elimination</p> <p><i>or any other valid explanation</i></p> | <p>Scale 5A (0, 5)</p> | | | | | | | | | | | | |

| Q3 | Model Solution – 50 Marks | Marking Notes |
|--------------|--|--|
| (a) (i) | $14 \times 5 = 70 \text{ cm}$ | <p>Scale 10B (0, 7, 10) Accept correct answer without work. Accept correct answer without units.</p> <p>Partial Credit</p> <ul style="list-style-type: none"> • Some relevant calculation • Some relevant drawing |
| (a) (ii) | $4.2 \text{ m} = 420 \text{ cm}$ $420 \div 21 = 20 \text{ bricks}$ | <p>Scale 5C (0, 3, 4, 5) Accept correct answer without work.</p> <p>Low Partial Credit</p> <ul style="list-style-type: none"> • Use of 21 or 4.2 • Conversion of units <p>High Partial Credit</p> <ul style="list-style-type: none"> • 0.2 • Use of 21 and 4.2 |
| (a) (iii) | $20 \times 5 = 100 \text{ bricks}$ | <p>Scale 10B (0, 7, 10) Accept correct answer without work.</p> <p>Partial Credit</p> <ul style="list-style-type: none"> • Transfer of answer from (i) or (ii) • Some relevant calculation |
| (b) | $120 \times 0.60 \times 1.135 = \text{€}81.72$ <p style="text-align: center;">OR</p> $72 \times 13.5 \div 100 = \text{€}9.72$ $72 + 9.72 = \text{€}81.72$ | <p>Scale 10C (0, 5, 8, 10) Accept correct answer in euro without work.</p> <p>Low Partial Credit</p> <ul style="list-style-type: none"> • One correct calculation <p>High Partial Credit</p> <ul style="list-style-type: none"> • Two correct calculations, for example: Calculates $120 \times 0.6 = \text{€}72$; or calculates $72 \times 13.5 = 972$; or calculates VAT of $\text{€}9.72$ <p>Full Credit –1</p> <ul style="list-style-type: none"> • Correct answer in cent, but with no unit |
| (c) | $\frac{2}{3} \times 120 = 80 \text{ red bricks}$ | <p>Scale 10B (0, 7, 10) Accept correct answer without work.</p> <p>No Credit</p> <ul style="list-style-type: none"> • Answer = 30 and 90 with no work • Answer = $120 \div 2 = 60$ <p>Partial Credit</p> <ul style="list-style-type: none"> • Some work of merit • Answer = 30 and 90 with work <p>Full Credit –1</p> <ul style="list-style-type: none"> • Finds 40 (i.e. the number of yellow bricks) |

| Q3 | Model Solution – 50 Marks | Marking Notes |
|-----|--|---|
| (d) | 50 kg cement → 175 kg sand 10 kg cement → $\frac{175}{5} = 35$ kg sand 30 kg cement → $35 \times 3 = 105$ kg sand OR $175 \div 50 \times 30 = 105$ kg | Scale 5C (0, 3, 4, 5) Accept correct answer without work. Accept correct answer without units Low Partial Credit <ul style="list-style-type: none"> • Some work of merit • Answer = $175 \div 30 = 5.833$ • Answer = $175 \times 50 = 8750$ High Partial Credit <ul style="list-style-type: none"> • Finds a correct relevant “per unit” value (for example, per 1 kg cement, or per 10 kg cement) |

| Q4 | Model Solution – 50 Marks | Marking Notes |
|-----|---|---|
| (a) | $\text{€}234\,400 \div 10 = \text{€}23\,440$ Maitiú $23\,400 \times 7 = \text{€}164\,080$ Odhran $23\,400 \times 3 = \text{€}70\,320$ | <p>Scale 5C (0, 3, 4, 5) Accept correct answer without work. Accept correct answer in euro without unit</p> <p>Low Partial Credit</p> <ul style="list-style-type: none"> • Some work of merit, for example: finds 23440 • Answer = $234400 \div 7.3 = 32109.58904$ • Answer = $234400 \div 3 = 78133.33$ • Answer = $234400 \div 7 = 33485.71$ <p>High Partial Credit</p> <ul style="list-style-type: none"> • Finds one correct answer • Misplaced decimal, otherwise correct <p>Full Credit –1</p> <ul style="list-style-type: none"> • Correct answers presented in incorrect boxes |
| (b) | $\text{€}450 \times 1.12 = \504 | <p>Scale 10B (0, 7, 10) Accept correct answer without work. Accept correct answer without units.</p> <p>No Credit</p> <ul style="list-style-type: none"> • Answer = 450 or 1.12 <p>Partial Credit</p> <ul style="list-style-type: none"> • Use of a relevant figure, for example: $\text{€}450 \div 1.12 = 401.78$ <p>Full Credit –1</p> <ul style="list-style-type: none"> • Incorrect units ($\text{€}504$) |
| (c) | $14:01 + 5 \text{ hours} = 19:01$ $19:01 - 10:10$ = 8 hours and 51 minutes | <p>Scale 10C (0, 5, 8, 10) Accept correct answer without work. Accept 8:51 or 8:51 hours</p> <p>Low Partial Credit</p> <ul style="list-style-type: none"> • Converts a time to a different time zone • Some work of merit in finding difference • Ignores 5 hour time difference and uses 1 hour = 100 minutes ($14.01 - 10.10 = 3.91$ or 4 hrs 31 min) • Answer = 4 hours + any minutes <p>High Partial Credit</p> <ul style="list-style-type: none"> • Finds 3 hours 51 minutes • Use 1 hour = 100 minutes, otherwise correct ($14.01 + 5 - 10.10 = 8.91$ or 9 hrs 31 min) • Converts a time to a different time zone and has some work of merit in finding difference <p>Full Credit –1</p> <ul style="list-style-type: none"> • Answer = 8.51 or 8.51 hours |

| Q4 | Model Solution – 50 Marks | Marking Notes |
|----------|---|--|
| (d) | $C = \frac{5 \times (86 - 32)}{9}$ $= \frac{5 \times (54)}{9}$ $= 30^{\circ}\text{C}$ | <p>Scale 10C (0, 5, 8, 10) Accept correct answer without work. Accept correct answer without units</p> <p>Low Partial Credit</p> <ul style="list-style-type: none"> • Correct substitution for F • Some correct work with formula <p>High Partial Credit</p> <ul style="list-style-type: none"> • Correct substitution and some correct work with formula |
| (e), (f) | <p>(e)</p> $\frac{3}{4} = 75\%$ $0.04 = 4\%$ $\frac{2}{5} = 40\%$ $6.76 = 2.6^2$ <p>(f)</p> <p>Divide by 10</p> <p>No change to the value</p> <p>Round to 2 decimal places</p> <p>Round to the nearest 1000</p> | <p>Scale 15E (0, 3, 6, 9, 12, 15) Note: there are 6 answers in parts (e) and (f) combined</p> <p>Low Partial Credit</p> <ul style="list-style-type: none"> • 1 correct answer <p>Low Mid Partial Credit</p> <ul style="list-style-type: none"> • 2 correct answers <p>High Mid Partial Credit</p> <ul style="list-style-type: none"> • 3 correct answers <p>High Partial Credit</p> <ul style="list-style-type: none"> • 4 correct answers |

| Q5 | Model Solution – 50 Marks | Marking Notes |
|---------|--|---|
| (a)(i) |  | <p>Scale 10D (0, 4, 6, 8, 10)</p> <p>Low Partial Credit</p> <ul style="list-style-type: none"> • Arc or rectangle drawn freehand or outside tolerance • Point B marked on correct line <p>Mid Partial Credit</p> <ul style="list-style-type: none"> • Arc or rectangle correctly drawn and no attempt at drawing other <p>High Partial Credit</p> <ul style="list-style-type: none"> • Arc or rectangle fully correct and attempts to draw other <p>Full Credit –1</p> <ul style="list-style-type: none"> • Diagram correct but point <i>B</i> not labelled |
| (a)(ii) | <p>Distance on diagram (cm) = 4 cm Actual distance (in yards) = 16 yards</p> | <p>Scale 5B (0, 3, 5)</p> <p>Tolerance ± 0.2 cm</p> <p>Accept correct answers without units.</p> <p>Partial Credit</p> <ul style="list-style-type: none"> • 1 correct |

| Q5 | Model Solution – 50 Marks | Marking Notes |
|-----|---|--|
| (b) | (i) $2 \times (105 + 68)$ $= 2 \times 173$ $= 346 \text{ m}$ (ii) $105 \times 68 = 7140 \text{ m}^2$ | <p>Scale 15D (0, 5, 9, 12, 15) Accept correct answers without work. For <i>Full Credit</i> answers need to be presented in correct place (perimeter in (i) and area in (ii)).</p> <p>Low Partial Credit</p> <ul style="list-style-type: none"> • Work of merit relevant to one part <p>Mid Partial Credit</p> <ul style="list-style-type: none"> • Finds area • Work of merit relevant to both parts <p>High Partial Credit</p> <ul style="list-style-type: none"> • Finds perimeter • Finds area and work of merit relevant to finding perimeter <p>Full Credit –1</p> <ul style="list-style-type: none"> • Correct answer but unit(s) omitted or incorrect • Perimeter and area of penalty box in (a) found |
| (c) | $6800 \div 500 = 13.6$, so 14 bags are needed. $14 \times \text{€}120 = \text{€}1680$ | <p>Scale 15C (0, 5, 10, 15) Accept correct answer without work. Accept correct answer in euro with no units.</p> <p>Low Partial Credit</p> <ul style="list-style-type: none"> • Uses a relevant figure <p>High Partial Credit</p> <ul style="list-style-type: none"> • Finds 13.6 or 14 <p>Full Credit –1</p> <ul style="list-style-type: none"> • Incorrect or no rounding, otherwise correct ($13.6 \times 120 = 1632$ or $13 \times 120 = 1560$) |
| (d) | $d^2 = 132^2 + 85^2$ $d^2 = 17\,424 + 7225$ $d^2 = 24\,649$ $d = \sqrt{24\,649}$ $d = 157 \text{ m}$ | <p>Scale 5C (0, 3, 4, 5)</p> <p>Low Partial Credit</p> <ul style="list-style-type: none"> • States theorem of Pythagoras • Indicates squaring of a relevant number • Correct substitution and stops <p>High Partial Credit</p> <ul style="list-style-type: none"> • Finds 24 649 • Makes mistake in squaring, but continues to finish correctly. <p>Full Credit –1</p> <ul style="list-style-type: none"> • Incorrect or no units, otherwise correct (as long as <i>Full Credit –1</i> was not awarded for incorrect or no units in Q5(b)). |

Credit mark ranges

Candidates are awarded a credit from 0 to 10, inclusive, depending on the mark they are awarded. The mark ranges associated with each credit are shown below.

| Mark Range | Credit |
|------------|--------|
| 180 – 200 | 10 |
| 162 – 179 | 9 |
| 144 – 161 | 8 |
| 126 – 143 | 7 |
| 108 – 125 | 6 |
| 90 – 107 | 5 |
| 72 – 89 | 4 |
| 54 – 71 | 3 |
| 36 – 53 | 2 |
| 18 – 35 | 1 |
| 0 – 17 | 0 |

Bonus marks for answering through Irish

Bonus marks are applied as follows:

If the mark achieved is 150 or less, the bonus is 5% of the mark obtained, rounded **down**.

For instance, $138 \text{ marks} \times 5\% = 6.9 \Rightarrow \text{bonus} = 6 \text{ marks}$.

If the mark achieved is above 150, the following table applies:

| Bunmharc (Mark achieved) | Marc Bónais (Bonus mark) | Bunmharc (Mark achieved) | Marc Bónais (Bonus mark) |
|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
| 151 – 153 | 7 | 174 – 180 | 3 |
| 154 – 160 | 6 | 181 – 186 | 2 |
| 161 – 166 | 5 | 187 – 193 | 1 |
| 167 – 173 | 4 | 194 – 200 | 0 |

