Pre-Leaving Certificate Mathematics – Paper 2 Higher level

Structure of the marking scheme

Candidate responses to the various questions are marked according to different scales, depending on the types of response that are 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, 2, 5	0, 2, 4, 5		
10 mark scale	0, 10	0, 5, 10	0, 3, 7, 10	0, 2, 5, 8, 10	
15 mark scale	0, 15	0, 7, 15	0, 5, 10, 15	0, 4, 7, 11, 15	
20 mark scale	0, 20	0, 10, 20	0, 7, 13, 20	0, 5, 10, 15, 20	
25 mark scale		0, 12, 25	0, 8, 17, 25	0, 6, 12, 19, 25	0, 5, 10, 15, 20, 25

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 (middle 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 almost half-right (lower middle partial credit)
- response more than half-right (upper middle partial credit)
- almost correct response (high partial credit)
- correct response (full credit)

Summary of mark allocations and scales to be applied

Note: A ✪ associated with a mark/scale signifies that a deduction is made where the candidate has omitted the relevant units or has failed to round correctly.

Section A

Question 1
- (a) 5B
- (b) 10C
- (c) 5B
- (d) 5C

Question 2
- (a) 5B
- (b) 5C
- (c) 5B
- (d) 10B

Question 3
- (a) 15C
- (b) 10B✪

Question 4
- (a) 5B, 5B✪
- (b) (i) 5 B
  (ii) 10 C

Question 5
- (a) (i) 5C
  (ii) 5C
- (b) (i) 5B✪
  (ii) 10C✪

Question 6
- (a) 10C
- (b) 5A,10C

Section B

Question 7
- (a) 15C
- (b) 5A, 5A
- (c) 10B
- (d) 15C

Question 8
- (a) 15C✪
- (b) (i)10B✪
  (ii) 5B
- (c) 20D✪

Question 9A
- (a) 15C✪
- (b) 5A✪
- (c) 10C
- (d) 10C, 10C

Question 9B
- (a) 10B, 15C
- (b) (i)15C✪
  (ii)10C

Detailed marking notes

Section A

Question 1

(a) Scale 5B(0,2,5)
Partial credit: correct equation but not in the correct form. e.g Y- 2 = 3(X - 0)

(b) Scale 10C(0,3,7,10)
High Partial credit: if only one of the four is incorrect

Low partial credit: two of the four quantities are correct (m_1,m_2,C_1C_2)

(c) Scale 5B(0,2,5)
Partial credit: Slope or intercept correct.
No credit for finding the equation of l_4

(d) Scale 5C(0,2,4,5)

Full credit: accurate diagram showing line clearly passing through (27,-5)
show that steps repeatedly across 3 down 1 gets to (27,-5)
rather than (27,-4) or shows that slope from (0,4) to (27,-4) is not equal to $-\frac{1}{3}$ and states conclusion.
High *Partial credit:* correct work shown but no conclusion stated, e.g. stops at -4≠-5

Low partial credit: any substantial correct step e.g. correctly find slope of l_4

Question 2

(a) Scale 5B(0,2,5)
Partial credit: Correct centre and/or radius

(b) Scale 5C(0,2 ,4,5)
High Partial credit: Correct equation but not in simplified form

Low Partial credit: Correct relevant step e.g. find slope of radius

(c) Scale 5B(0,2,5)
Partial credit: finding X = 13½, but co-ordinates not given.

No credit: for wrong axis.

(d) Scale 10B(0,5,10)
Partial credit: PQ and QR found fully correct or finds dot product for incorrect PQ and QR

Note:Do not penalize candidates for incorrect notation

Question 3

(a) Scale 15C (0,5,10,15)
High partial credit: three correct,
1st -0.2 to +0.2, 2nd -0.95 to -0.8
3rd 0.25 to 0.55, 4th -0.45 to -0.15

Low partial credit: two correct, or first correct and all signs correct

(b) Scale 10 B✪ (0,5,[9],10)

✪ Note: fails to round correctly 9 marks
Partial credit: answer between 0.6 and 0.9

Question 4

(a) Scale 5 B (0,2,5) Finds Cos B or Cos D
Partial credit: correct method with one or two errors for finding any angle in ABD

Scale 5 B ✪ (0,2,[4],5) Finishes
Partial credit: correct method with one or two errors

(b)
(i) Scale 5 B (0,2,5)
Partial credit: one error or same error in both expressions

(ii) Scale 10 C (0,3,7,10)
High partial credit: clears the fractions and gets all terms to correct side

Low partial credit: Cos $\alpha = -$ Cos β or equivalent.

No credit: for multiplying out RHS

Question 5

(a)

(i) Scale 5 C (0,2,4,5)
High Partial credit: three correct

Low partial credit : two correct

(ii) Scale 5 C (0,2,4,5)
High Partial credit: mentions two of the three conditions or gives clear description using an example eg 'it when you do something a number of times like rolling a die'

Low partial credit: mentions one of the three conditions or just gives an example without a description eg 'rolling a die three times'

(b)

(i) Scale 5 B✪ (0,2,[4]5)
Note: ✪ fails to round

Partial credit: correctly identify p, q ,n and r either explicitly or in the formula

(ii) Scale 10 C ✪ (0,3,7, [9],10)
Note: ✪ fails to round

High Partial credit: correct expression for the P(<9) or all terms worked out with a max of one error.
Low Partial credit: correct expression for P(10) or correct expression for P(0) + P(561)….+ P(8)

Question 6

(a) Scale 10C (0,3,7,10)
High Partial credit: two or three mediators complete with construction lines but no circle drawn.

Low partial credit: one mediator or two mediators with no construction lines

(b) Scale 5 A (0,5)
*C*ondition
Full credit: None of the angles obtuse, bigger than 90°

Scale10 C (0,3,7,10)
Justification
High partial credit: answer that indicates that the candidate shows understanding of the relevance of the angle, the opposite side and the centre t without explicit reference to the angle at the centre.

*Low partial credit: C*andidate deals only with the case of 90°
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Section B

Question 7

(a) Scale 15 C (0,5,10,15)

High partial credit: Correct plot with up to three numerical errors or error in scale.

Low partial credit: Correct plot of one set of data or correctly drawn in appropriate plot eg pie- charts.

(b) Scale 5A (0,5)
Difference
Must be a valid statement about the distribution not individual data points

Scale 5 A (0,5)
Similarity
Must be a valid statement about the distribution not individual data points

(c) Scale 10 B (0,5,10)
Full credit: a full and clear justification explaining why this sample is biased.
e.g.The samples are sufficiently different that this would not happen by chance.
or the samples are sufficiently similar that this could have happened by chance.

Partial credit: decision and justification relation to sample only.

No credit: for answer without justification.

(d) Scale 15 C (0,5,10,15)
Full credit: for two improvements with correct justifications.

High partial credit: two improvements with one justification.

Low partial credit: two improvements with no justification.

Question 8

(a) Scale 15C✪ (0,5,10,[14],15)
Note: ✪ omission of units

High partial credit: correct method with to one or two mistakes

Low partial credit: incomplete attempt with some substantial work of merit.

(b)

(i) Scale 10 B✪ (0,5,[9]10)
Note:✪ omission of units

Partial credit: correct method not accurately executed

(ii) Scale 5 B (0,2,5)
Full credit: 3 statements that would be full credit. e.g. R-10 cannot be negative ratio

Partial credit: Evidence that the candidate understands the relationship between the radius and the height in this case. Candidate makes the reference to being more than half a circle.

(c) Scale 20 D✪ (0,5,10,15,[19],20)
Note:✪ omission of units or failure to round
Note: omission of units and rounding down is high partial credit.

Full credit: The candidate must have the answer 9.3611…., 9.362, 9.37, 9.4

High partial credit: correct equation set up but not solved correctly

Middle partial credit: candidate sets up the equation largely correct and finished accurately

Low partial credit: incorrect set up of equation e.g. treats wingspan as building span, but finishes out.

Question 9A

(a) Scale 15 C ✪ (0,5,10,[14],15)
Note: ✪ omission of units
Note:First two lines of solution not essential.

High partial credit: correct approach with an error in calculations or incorrect substitution in equation

Low partial credit: Correct statement of equation or correct z – value or calculate $x \pm 1.96\ \sigma$

(b) Scale 5 A ✪(0,[4],5)
Note: ✪ omission of units (€)

Full Credit: We can be 95% certain that the mean rent for a 3 bedroom house in Dublin lies between €941.25 and € 1238.75. or statements that refer to the mean line and level of 95% certainty or very certain, highly certain, very confident.

(c) Scale 10 C (0,3,7,10)
Full credit: Alternative methods of calculation (p.42 of October trial report).

High partial credit: Calculation accurate but error or omission of one hypothesis or the conclusion.
Low partial credit: statement of both null and alternative hypothesis without any calculations or Calculation accurate but no hypothesis and no conclusion or critical error in calculation e.g. omits $\sqrt{n}$.

(d) Scale 10 C (0,3,7,10)
High Partial credit: Omitted or incorrect one of the three requirements

Low Partial credit: Omitted or incorrect two of the three requirements

Scale 10 C (0,3,7,10)
High Partial credit: Omitted or incorrect one of the three requirements

Low Partial credit: Omitted or incorrect two of the three requirements

Question 9B

(a) Scale 10 B (0,5,10) Construction
Partial credit: Construction given in diagram but not properly stated in text.

Scale 15 C (0,5,10,15) Main proof and conclusion
High Partial credit: all critical steps present but not all justified

Low partial credit: omitted one or more critical steps

(b)

(i) Scale 15 C ✪ (0,5,10,[14],15)
Note: ✪ omission of units or failure to round
High Partial credit: Answer with correct method subject to one or errors in calculation.

Low Partial credit: An assumption that trivializes the problem. Eg non isosceles triangle as isosceles in this question, ACB as isosceles.

(ii) Scale 10C (0,3,7,10)
High Partial credit: Correct method but a counting error.

Low Partial credit: Calculation based on total perimeter only.

End