IMMANUEL HIGH SCHOOL

Nagavara, Bangalore – 560045

SA-1 MOCK / MODEL QUESTION PAPERS

MATHEMATICS — CLASS X (SSLC)

2025–26

Prepared as per the KSEAB SA-1 Blueprint & DSERT Lesson Based Assessment (LBA)
Portions covered: Real Numbers • Polynomials • Pair of Linear Equations in Two Variables • Quadratic Equations • Arithmetic Progressions • Triangles • Coordinate Geometry

SA-1 BLUEPRINT — MATHEMATICS (CLASS X)

80 Marks · 38 Questions · 3 Hours 15 Minutes (as per KSEAB pattern, Subject Code 81E)

Chapter	MCQ (1 m)	VSA (1 m)	SA (2 m)	LA (3 m)	LA (4 m)	LA (5 m)	Total Marks
1. Real Numbers	1	1	1	1	0	0	7
2. Polynomials	1	1	2	1	0	0	9
3. Pair of Linear Equations in Two Variables	2	1	1	2	1	0	15
4. Quadratic Equations	1	1	1	1	1	0	11
5. Arithmetic Progressions	1	1	1	2	1	0	14
6. Triangles	1	2	1	1	1	1	17
7. Coordinate Geometry	1	1	1	1	0	0	7
TOTAL	**8**	**8**	**8**	**9**	**4**	**1**	**80**

PREPARATION NOTE FOR TEACHERS

SA-1 Blueprint basis:

The blueprint above follows the KSEAB SSLC Mathematics pattern (Subject Code 81E): 38 questions totalling 80 marks — Part A: 8 MCQ (1 mark) + 8 Very Short Answer (1 mark); Part B: 8 Short Answer (2 marks); Part C: 9 Long Answer (3 marks); Part D: 4 Long Answer (4 marks) + 1 Long Answer (5 marks). Chapter-wise weightage is distributed proportionally, giving the highest marks to Triangles and Pair of Linear Equations in Two Variables, consistent with DSERT/KSEAB's published emphasis for these two units, followed by Arithmetic Progressions and Quadratic Equations.

Alignment with DSERT Lesson Based Assessment (LBA):

Both model papers draw heavily on question styles and difficulty levels used in the DSERT LBA question bank / unit tests for these 7 chapters (25-mark chapter-wise unit tests conducted through the term). Concept-check items such as stating theorems (BPT, Pythagoras, AA similarity), verifying zero–coefficient relationships, nature-of-roots (discriminant) questions, and formula-recall one-mark questions mirror the LBA competency-based question format, so that SA-1 functions as a consolidated, cumulative check of everything already assessed lesson-by-lesson through LBA.

Coverage of important / repeated previous-year questions:

1. Real Numbers – Euclid's Division Lemma/Algorithm (HCF by long division), proof that √2, √3, √5 are irrational, Fundamental Theorem of Arithmetic.

2. Polynomials – finding zeroes and verifying the zero–coefficient relationship (2 & 3 mark), forming a quadratic polynomial given sum & product of zeroes.

3. Pair of Linear Equations – graphical solution (3 marks), cross-multiplication / elimination / substitution methods, consistency check, and word problems on ages, fractions, numbers, and speed–distance–time (4 marks) — a perennial board favourite.

4. Quadratic Equations – solving by factorisation and the quadratic formula, discriminant/nature of roots, word problems on consecutive integers, ages, and speed (3 & 4 marks).

5. Arithmetic Progressions – finding nth term / sum of n terms, 'which term is...' type questions, and word-based AP problems (3 & 4 marks) — consistently high-weightage.

6. Triangles – BPT and its converse, Pythagoras theorem and its converse, AA/SAS/SSS similarity criteria, area-of-similar-triangles theorem — the single highest-weightage chapter, and the usual source of the 5-mark question.

7. Coordinate Geometry – distance formula, section formula (internal division), midpoint, and area of a triangle using coordinates.

Note: *The exact official KSEAB SA-1 chapter-wise blueprint sheet issued to schools each year is distributed by KSEAB/DSERT to Block/Cluster offices and is not always mirrored on the public KSEAB website (kseab.karnataka.gov.in blocks automated access). The distribution used here has been reconstructed from KSEAB's published annual SSLC blueprint weightage, cross-checked with recent 81E SA-1 model papers and the DSERT LBA guidelines. Please verify against the school's official circular copy of the SA-1 blueprint, if available, and adjust question numbers accordingly before final printing.*

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SUMMATIVE ASSESSMENT – 1 (2025–26) — MODEL PAPER 1

MATHEMATICS — CLASS X (SSLC)

(As per KSEAB SA-1 Blueprint, Subject Code 81E — DSERT LBA aligned)

Time: 3 hours 15 minutes **Max. Marks: 80**

General Instructions:

1. This question paper has four parts: Part A, Part B, Part C and Part D.
2. Part A carries objective type (MCQ) and very short answer questions; Part B, C and D carry short and long answer questions.
3. All questions are compulsory. Internal choice (OR) is provided in a few 3, 4 and 5-mark questions as indicated.
4. Write the question numbers correctly as given in the question paper while answering.
5. Draw neat labelled figures / graphs wherever necessary.
6. Use of calculators is not permitted.

PART – A (I. Multiple Choice Questions) *Answer all the questions by choosing the correct option. 8 × 1 = 8*

1. Euclid's division lemma states that for positive integers a and b, there exist unique integers q and r such that a = *[1]*

(A) bq + r, $0 \le r < b$

(B) bq – r, $0 < r \le b$

(C) qr + b, $0 \le r < q$

(D) br + q, $0 \le q < b$

2. If the zeroes of the polynomial $x^2 - 5x + 6$ are α and β, then α + β is equal to *[1]*

(A) 5

(B) –5

(C) 6

(D) –6

3. The pair of linear equations x + 2y = 5 and 2x + 4y = 10 has *[1]*

(A) a unique solution

(B) no solution

(C) infinitely many solutions

(D) exactly two solutions

4. The nature of roots of the quadratic equation $2x^2 - 4x + 3 = 0$ is *[1]*

(A) real and equal

(B) real and distinct

(C) no real roots

(D) cannot be determined

5. The common difference of the A.P. 3, 1, –1, –3, … is *[1]*

(A) 2

(B) –2

(C) 3

(D) –3

6. In ΔABC, DE ∥ BC and AD/DB = 2/3, then AE/EC = *[1]*

(A) 2/3

(B) 3/2

(C) 2/5

(D) 5/2

7. The distance between the points (0, 0) and (3, 4) is *[1]*

(A) 5 units

(B) 7 units

(C) 3 units

(D) 4 units

8. If one root of $x^2 – 6x + k = 0$ is 4, then the value of k is *[1]*

(A) 8

(B) –8

(C) 6

(D) 4

PART – A (II. Very Short Answer Type Questions) *Answer all the questions. 8 × 1 = 8*

9. Write the HCF of the smallest prime number and the smallest composite number. *[1]*

10. Find the number of zeroes of the polynomial whose graph is given (a straight line parallel to the x-axis). *[1]*

11. Write the condition for the pair of linear equations $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ to have a unique solution. *[1]*

12. Write the standard form of a quadratic equation. *[1]*

13. Find the 10th term of the A.P. 2, 7, 12, … *[1]*

14. State Basic Proportionality Theorem (Thales Theorem). *[1]*

15. Write the formula to find the coordinates of the midpoint of a line segment joining the points (x_1, y_1) and (x_2, y_2). *[1]*

16. Find the discriminant of the quadratic equation $x^2 – 4x + 4 = 0$. *[1]*

PART – B (III. Short Answer Type Questions) *Answer all the questions. 8 × 2 = 16*

17. Prove that √3 is an irrational number. *[2]*

18. Find the zeroes of the polynomial $p(x) = x^2 – 3x – 10$ and verify the relationship between the zeroes and coefficients. *[2]*

19. Find the zeroes of the quadratic polynomial $4x^2 – 4x – 3$ and verify the relation between zeroes and its coefficients. *[2]*

20. Solve the pair of linear equations x + y = 14 and x – y = 4 by the method of elimination. *[2]*

21. Find the roots of the quadratic equation $x^2 – 3x – 10 = 0$ by factorisation. *[2]*

22. Find the sum of first 15 terms of the A.P. 7, 13, 19, 25, … using the appropriate formula. *[2]*

23. In the given figure, if ΔABC ~ ΔPQR, AB = 4 cm, PQ = 6 cm and QR = 9 cm, find BC. *[2]*

24. Find the area of the triangle whose vertices are (1, –1), (–4, 6) and (–3, –5). *[2]*

PART – C (IV. Long Answer Type Questions) *Answer all the questions. 9 × 3 = 27*

25. Use Euclid's division algorithm to find the HCF of 4052 and 12576. *[3]*

26. Find a quadratic polynomial whose sum and product of zeroes are respectively 1/4 and –1, and verify the relation between the zeroes and coefficients. *[3]*

27. Solve graphically the pair of linear equations x – y = 1 and 2x + y = 8. Also find the coordinates of the points where the lines meet the y-axis. *[3]*

28. Solve the pair of linear equations 3x – 5y – 4 = 0 and 9x = 2y + 7 using the cross-multiplication method. *[3]*

29. The sum of the squares of two consecutive positive integers is 365. Find the integers. *[3]*

OR

29 OR. Find two consecutive odd positive integers, sum of whose squares is 290. *[3]*

30. Which term of the A.P. 3, 15, 27, 39, … will be 132 more than its 54th term? *[3]*

31. How many terms of the A.P. 9, 17, 25, … must be taken so that their sum is 636? *[3]*

32. State and prove the Pythagoras theorem for a right-angled triangle. *[3]*

33. Find the coordinates of the point which divides the line segment joining the points (4, –3) and (8, 5) in the ratio 3 : 1 internally. *[3]*

PART – D (V. Long Answer Type Questions) *Answer all the questions. 4 × 4 = 16*

34. Five years ago, Nuri was thrice as old as Sonu. Ten years later, Nuri will be twice as old as Sonu. Find their present ages by forming and solving a pair of linear equations. *[4]*

OR

34 OR. A fraction becomes 9/11 if 2 is added to both numerator and denominator. If 3 is added to both numerator and denominator, it becomes 5/6. Find the fraction. *[4]*

35. A train travels 360 km at a uniform speed. If the speed had been 5 km/h more, it would have taken 1 hour less for the same journey. Find the speed of the train. *[4]*

36. The sum of the 4th and 8th terms of an A.P. is 24, and the sum of the 6th and 10th terms is 44. Find the first three terms of the A.P. *[4]*

OR

36 OR. In an A.P., the sum of first n terms is given by $S_n = 3n^2 + 5n$. Find the A.P. and its 15th term. *[4]*

37. Prove that in two similar triangles, the ratio of the areas of the triangles is equal to the square of the ratio of their corresponding sides. *[4]*

PART – D (VI. Long Answer Type Question) *1 × 5 = 5*

38. State and prove the Basic Proportionality Theorem (Thales Theorem): 'If a line is drawn parallel to one side of a triangle intersecting the other two sides in distinct points, the other two sides are divided in the same ratio.' *[5]*

OR

38 OR. Prove that the ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding sides. Using this result, find the ratio of areas of two similar triangles whose corresponding sides are in the ratio 4 : 5. *[5]*

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SUMMATIVE ASSESSMENT – 1 (2025–26) — MODEL PAPER 2

MATHEMATICS — CLASS X (SSLC)

(As per KSEAB SA-1 Blueprint, Subject Code 81E — DSERT LBA aligned)

Time: 3 hours 15 minutes **Max. Marks: 80**

General Instructions:

1. This question paper has four parts: Part A, Part B, Part C and Part D.
2. Part A carries objective type (MCQ) and very short answer questions; Part B, C and D carry short and long answer questions.
3. All questions are compulsory. Internal choice (OR) is provided in a few 3, 4 and 5-mark questions as indicated.
4. Write the question numbers correctly as given in the question paper while answering.
5. Draw neat labelled figures / graphs wherever necessary.
6. Use of calculators is not permitted.

PART – A (I. Multiple Choice Questions) *Answer all the questions by choosing the correct option. 8 × 1 = 8*

1. The HCF of two co-prime numbers is *[1]*

(A) 1
(B) 0
(C) the smaller number
(D) the larger number

2. A quadratic polynomial whose zeroes are 2 and –3 is *[1]*

(A) $x^2 + x - 6$
(B) $x^2 - x - 6$
(C) $x^2 + x + 6$
(D) $x^2 - x + 6$

3. The lines representing the pair of equations $2x - 3y = 5$ and $4x - 6y = 15$ are *[1]*

(A) intersecting
(B) parallel
(C) coincident
(D) perpendicular

4. The value of the discriminant of the quadratic equation $x^2 + 4x + 4 = 0$ is *[1]*

(A) 0
(B) 16
(C) –16
(D) 8

5. If the nth term of an A.P. is $3n - 1$, then its first term is *[1]*

(A) 2
(B) 3

(C) –1

(D) 1

6. Two triangles are said to be similar if their corresponding angles are equal and their corresponding sides are *[1]*

(A) equal

(B) proportional

(C) perpendicular

(D) parallel

7. The point which lies on the y-axis is *[1]*

(A) (0, 5)

(B) (5, 0)

(C) (5, 5)

(D) (–5, 5)

8. The sum of the roots of the quadratic equation $2x^2 – 8x + 6 = 0$ is *[1]*

(A) 4

(B) –4

(C) 3

(D) 8

PART – A (II. Very Short Answer Type Questions) *Answer all the questions. 8 × 1 = 8*

9. Write the fundamental theorem of arithmetic. *[1]*

10. If p(x) is a polynomial of degree 3, write the maximum number of zeroes it can have. *[1]*

11. Write the condition for the pair of linear equations $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ to have no solution. *[1]*

12. Write the formula used to find the roots of a quadratic equation $ax^2 + bx + c = 0$ by the quadratic formula method. *[1]*

13. Write the formula for the sum of first n terms of an A.P. whose first term is a and common difference is d. *[1]*

14. Write the criterion for the similarity of two triangles known as the AA similarity criterion. *[1]*

15. Write the distance formula to find the distance between the points (x_1, y_1) and (x_2, y_2). *[1]*

16. Find the sum of the zeroes of the polynomial $p(x) = 2x^2 – 5x + 3$. *[1]*

PART – B (III. Short Answer Type Questions) *Answer all the questions. 8 × 2 = 16*

17. Prove that $5 + \sqrt{2}$ is an irrational number, given that $\sqrt{2}$ is irrational. *[2]*

18. Find the zeroes of the polynomial $p(x) = x^2 – 2x – 8$ and verify the relationship between the zeroes and coefficients. *[2]*

19. Check whether the pair of linear equations $5x – 4y + 8 = 0$ and $7x + 6y – 9 = 0$ is consistent. Give reason. *[2]*

20. Find the roots of the quadratic equation $2x^2 – 5x + 3 = 0$ by using the quadratic formula. *[2]*

21. In an A.P., the first term is 5, the last term is 45 and the sum is 400. Find the number of terms and the common difference. *[2]*

22. In the figure, DE ∥ BC. If AD = 1.5 cm, DB = 3 cm and AE = 1 cm, find EC. *[2]*

23. Find the ratio in which the y-axis divides the line segment joining the points (5, –6) and (–1, –4). *[2]*

24. Find the value of k for which the quadratic equation $2x^2 + kx + 3 = 0$ has equal roots. *[2]*

PART – C (IV. Long Answer Type Questions) *Answer all the questions. 9 × 3 = 27*

25. Prove that $\sqrt{2}$ is irrational. *[3]*

26. Obtain all zeroes of the polynomial $p(x) = x^4 – 3x^3 + x^2 + 3x – 2$, if two of its zeroes are 1 and –1. *[3]*

27. Solve graphically the pair of linear equations $x + y = 5$ and $2x – y = 4$. Also find the vertices of the triangle formed by these lines and the x-axis. *[3]*

28. Solve the following pair of linear equations by the substitution method: $3x + 2y = 11$ and $2x + 3y = 4$. *[3]*

29. The product of Sunita's age (in years) five years ago and her age ten years later is 16. Find her present age. *[3]*

OR

29 OR. A cottage industry produces a certain number of pottery articles in a day. It was observed that on a particular day the cost of production of each article (in rupees) was 3 more than twice the number of articles produced that day. If the total cost of production that day was ₹90, find the number of articles produced. *[3]*

30. In an A.P., the sum of the 3rd and 7th terms is 6, and their product is 8. Find the sum of the first 16 terms of the A.P. *[3]*

31. Find the sum of first 24 terms of the A.P. whose nth term is given by $a_n = 3 + 2n$. *[3]*

32. State and prove that if a line divides two sides of a triangle in the same ratio, then the line is parallel to the third side (converse of Basic Proportionality Theorem). *[3]*

33. Find the value of x for which the distance between the points A(2, –3) and B(x, 5) is 10 units. *[3]*

PART – D (V. Long Answer Type Questions) *Answer all the questions. 4 × 4 = 16*

34. The sum of a two-digit number and the number obtained by reversing the digits is 66. If the digits of the number differ by 2, find the number. How many such numbers are there? *[4]*

OR

34 OR. The taxi charges in a city consist of a fixed charge together with the charge for the distance covered. For a distance of 10 km, the charge paid is ₹105, and for a journey of 15 km, the charge paid is ₹155. What are the fixed charges and the charge per km? Also find the total charge for a distance of 25 km. *[4]*

35. A motor boat whose speed is 18 km/h in still water takes 1 hour more to go 24 km upstream than to return downstream to the same spot. Find the speed of the stream. *[4]*

36. The sum of the first 7 terms of an A.P. is 49 and the sum of the first 17 terms is 289. Find the sum of the first n terms of the A.P. *[4]*

OR

36 OR. If the sum of first n terms of an A.P. is $4n – n^2$, find its 1st, 2nd and 3rd terms, and hence find its nth term. *[4]*

37. Prove that the diagonals of a trapezium ABCD, in which AB ∥ CD, intersect each other at point O, divide each other proportionally, using the Basic Proportionality Theorem. *[4]*

PART – D (VI. Long Answer Type Question) *1 × 5 = 5*

38. State and prove Thales Theorem *[5]*

OR

38 OR. Prove that in a right triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides. Using this theorem, find the length of the diagonal of a rectangle whose sides are 12 cm and 5 cm. *[5]*