

SHIKSHA ACADEMY

Learning Doctor

CLASS 9 MATHEMATICS

2027 Annual Exam Practice Question Bank

Aligned to the CBSE Class IX Mathematics Curriculum 2026-27

132 carefully structured practice questions
15 chapters | Concept + Application + Reasoning

For students: Learn it → Practice it → Explain it → Apply it

Note: These are original practice questions aligned to the syllabus. Each question is written to be solvable on its own. They are not official CBSE questions and are not a prediction of the 2027 paper.

How to Use This Book

Foundation - Build the basic idea. Do these first and make sure every step is clear.

Scoring - Apply the concept. These are the kinds of questions where method + accuracy matter.

Ultra - Think deeper. Expect reasoning, proof, modelling or more than one concept.

Simple study rule: Finish the Foundation questions first. Then move to Scoring. Use Ultra questions to stretch your thinking and improve your written reasoning.

CBSE 2026-27 Mathematics Coverage

Unit	Area	Marks
I	Number System	7
II	Algebra	20
III	Coordinate Geometry	4
IV	Geometry	25
V	Mensuration	14
VI	Statistics & Probability	10

Chapter List

1. Number System (8 questions)
2. Introduction to Polynomials (8 questions)
3. Sequences and Progressions (10 questions)
4. Exploring Algebraic Identities (10 questions)
5. Linear Equations in Two Variables (9 questions)
6. Coordinate Geometry (7 questions)
7. Introduction to Euclid's Geometry (5 questions)
8. Lines and Angles (7 questions)
9. Triangles - Congruence Theorems (10 questions)
10. 4-gons (Quadrilaterals) (12 questions)
11. Circles (11 questions)
12. Area and Perimeter (10 questions)
13. Surface Area and Volume (9 questions)
14. Statistics (8 questions)
15. Introduction to Probability (8 questions)

Source note: This book follows the CBSE Class IX Mathematics Curriculum 2026-27, which is the curriculum for the 2027 annual examination. The questions are original practice material based on the listed curriculum concepts.

1. Number System

Unit I - Number System | 7 marks

Focus: Rational numbers, density, decimals, irrational numbers, proofs and the square-root spiral.

FOUNDATION	SCORING	ULTRA
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1. **[Foundation]** Represent $-7/3$ on the number line and explain the construction.
2. **[Foundation]** Find five rational numbers between $3/5$ and $4/5$.
3. **[Ultra]** Prove that between any two distinct rational numbers there are infinitely many rational numbers.
4. **[Scoring]** Classify 0.625 , $0.272727\dots$, $\sqrt{5}$ and π as rational or irrational numbers. Give a brief reason based on their properties or decimal representations.
5. **[Scoring]** Express $0.272727\dots$ as a rational number.
6. **[Ultra]** Prove that $\sqrt{2}$ is irrational.
7. **[Ultra]** Prove that $\sqrt{3}$ is irrational.
8. **[Scoring]** Starting with a unit segment, construct the first three radii of the square-root spiral and identify their lengths.

☐ I understand the basics ☐ I can solve without help ☐ I can explain my method

Working / Notes

2. Introduction to Polynomials

Unit II - Algebra | 20 marks (across 4 chapters)

Focus: Polynomials, patterns, linear growth/decay and $y = ax + b$.

FOUNDATION	SCORING	ULTRA
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9. **[Foundation]** For the polynomial $4x^2 - 7x + 3$, identify its terms, coefficients, variables and degree.
10. **[Foundation]** Write one polynomial each of degree 0, 1, 2 and 3.
11. **[Scoring]** An amount of ₹500 increases by ₹150 every month. Form a linear expression for its value after n months.
12. **[Scoring]** A tank contains 120 L of water and loses 9 L every hour. Form a linear expression for the amount of water left after h hours, until the tank becomes empty, and state what the expression means.
13. **[Scoring]** A plant is 1.75 m high initially and grows by 0.5 m each month. Find its height after 7 months and make a table showing its height from month 0 to month 7.
14. **[Foundation]** For the linear relation $y = 3x - 5$, identify the slope and y -intercept.
15. **[Scoring]** Draw the graphs of $y = 2x + 1$, $y = 4x + 1$ and $y = -x + 1$. Compare the three graphs and explain how changing the slope affects their steepness and direction.
16. **[Ultra]** The lines $y = 3x + 2$ and $y = 3x - 4$ have the same slope but different y -intercepts. Explain, using their graphs, why the lines are parallel.

☐ I understand the basics ☐ I can solve without help ☐ I can explain my method

Working / Notes

3. Sequences and Progressions

Unit II - Algebra | 20 marks (across 4 chapters)

Focus: Patterns, recursive and explicit rules, AP, GP, sums and applications including recursive patterns and Tower of Hanoi.

FOUNDATION	SCORING	ULTRA
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17. [Foundation] Find the next four terms and describe the rule: 2, 5, 8, 11, ...
18. [Foundation] Find the first five terms of the sequence $t_n = 3n - 4$, for $n = 1, 2, 3, \dots$
19. [Scoring] Write the explicit rule and a recursive rule, including the initial term, for the sequence 5, 9, 13, 17, ...
20. [Foundation] Find the 20th term of the AP 7, 12, 17, 22, ...
21. [Scoring] Which term of the AP 5, 9, 13, 17, ... is equal to 81?
22. [Scoring] Find the sum of the first 20 positive integers using the formula for the sum of an arithmetic sequence.
23. [Scoring] For the GP 3, 6, 12, 24, ..., find the 8th term and give one realistic example of a situation that can be modelled by this geometric growth pattern.
24. [Ultra] A ball is dropped from a height of 16 m. After each bounce, it rises to $\frac{3}{4}$ of its previous height. Find the height reached immediately after the 4th bounce.
25. [Foundation] A simple recursive square pattern starts with one square at Stage 0. At each stage, each square is divided into four smaller equal squares. How many small squares are present at Stage 4?
26. [Scoring] In a Tower of Hanoi puzzle, $T_1 = 1$, and the number of moves follows the recursive rule $T_n = 2T_{n-1} + 1$. Find T_4 .

☐ I understand the basics ☐ I can solve without help ☐ I can explain my method

Working / Notes

4. Exploring Algebraic Identities

Unit II - Algebra | 20 marks (across 4 chapters)

Focus: Identities, algebraic expansion, factorisation and simplifying algebraic expressions.

FOUNDATION	SCORING	ULTRA
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27. [\[Foundation\]](#) Expand $(3x + 5y)^2$.
28. [\[Foundation\]](#) Simplify $(7a - 3b)^2$ using an algebraic identity.
29. [\[Scoring\]](#) Use the identity $(a + b + c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ca$ to expand $(x + y + z)^2$.
30. [\[Scoring\]](#) Use an algebraic identity to calculate 103^2 without direct multiplication.
31. [\[Foundation\]](#) Factorise $x^2 + 10x + 25$.
32. [\[Scoring\]](#) Factorise $x^2 + 11x + 30$.
33. [\[Scoring\]](#) Factorise $x^2 - 5x + 6$.
34. [\[Scoring\]](#) Factorise $9x^2 - 24xy + 16y^2$ by identifying the suitable identity.
35. [\[Scoring\]](#) Simplify $(x^2 - 9)/(x^2 + 6x + 9)$, stating any restriction on x .
36. [\[Ultra\]](#) Given $x + y = 9$ and $xy = 14$, find $x^2 + y^2$ using an algebraic identity.

☐ I understand the basics ☐ I can solve without help ☐ I can explain my method

Working / Notes

5. Linear Equations in Two Variables

Unit II - Algebra | 20 marks (across 4 chapters)

Focus: Graphical solutions, slope-intercept form, pairs of equations, consistency and modelling.

FOUNDATION	SCORING	ULTRA
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37. **[Foundation]** Determine whether $(2, -1)$ is a solution of the linear equation $3x + 2y = 4$. Show your working.
38. **[Foundation]** Find any three different solutions of the linear equation $2x + y = 6$.
39. **[Foundation]** Draw the graph of $2x + 3y = 12$ and write the coordinates of any two points on the line.
40. **[Scoring]** Convert $3x - 2y = 8$ into slope-intercept form and identify its slope and y-intercept.
41. **[Scoring]** Solve the pair of equations $x + y = 5$ and $x - y = 1$ graphically.
42. **[Scoring]** Solve the pair of equations $2x + y = 7$ and $x - y = 2$ by substitution.
43. **[Scoring]** Solve the pair of equations $3x + 2y = 16$ and $2x - 2y = 4$ by elimination.
44. **[Scoring]** Classify each pair as having one solution, no solution or infinitely many solutions: (a) $x + y = 5$ and $2x + 2y = 10$; (b) $x + y = 5$ and $2x + 2y = 12$; (c) $x + y = 5$ and $x - y = 1$.
45. **[Ultra]** A school is a total of 23 adult and child tickets for a show. A ticket costs ₹80 and a child ticket costs ₹50. The total collection is ₹1,540. Form two linear equations and find the number of adult and child tickets sold.

☐ I understand the basics ☐ I can solve without help ☐ I can explain my method

Working / Notes

6. Coordinate Geometry

Unit III - Coordinate Geometry | 4 marks

Focus: Coordinates, distance, midpoint, collinearity and checking for a right-angled triangle.

FOUNDATION	SCORING	ULTRA
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46. **[Foundation]** Identify the quadrant of each point: $A(3, 4)$, $B(-2, 5)$, $C(-4, -3)$ and $D(5, -2)$.
47. **[Foundation]** Plot $A(0, 0)$, $B(4, 0)$, $C(4, 3)$ and $D(0, 3)$. Identify the shape formed.
48. **[Foundation]** Find the distance between the points $A(-2, 3)$ and $B(4, -5)$.
49. **[Foundation]** Find the midpoint of the line segment joining $A(-3, 5)$ and $B(7, -1)$.
50. **[Scoring]** The midpoint of AB is $M(2, 3)$ and A is $(-4, 5)$. Find the coordinates of B .
51. **[Scoring]** Check whether the points $A(1, 2)$, $B(3, 6)$ and $C(5, 10)$ are collinear using the distance method.
52. **[Ultra]** Determine whether the triangle with vertices $A(1, 2)$, $B(5, 2)$ and $C(5, 5)$ is right-angled. Use distances to justify your answer.

☐ I understand the basics ☐ I can solve without help ☐ I can explain my method

Working / Notes

7. Introduction to Euclid's Geometry

Unit IV - Geometry | 25 marks (across 5 chapters)

Focus: Definitions, axioms, postulates, parallelism and simple logical justification.

FOUNDATION	SCORING	ULTRA
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53. [Foundation] Distinguish between a definition, an axiom, a postulate and a theorem.
54. [Foundation] State Euclid's five postulates and explain the idea behind each one in simple words.
55. [Scoring] Define parallel lines and explain their relationship using Euclid's postulates.
56. [Scoring] If $AB = CD$ and $CD = EF$, use an appropriate axiom to show that $AB = EF$.
57. [Ultra] Describe the main steps and mathematical idea behind a square construction described in the Baudhayana Sulba Sutras.

☐ I understand the basics ☐ I can solve without help ☐ I can explain my method

Working / Notes

8. Lines and Angles

Unit IV - Geometry | 25 marks (across 5 chapters)

Focus: Linear pairs, vertically opposite angles, parallel lines and proof by contradiction.

FOUNDATION	SCORING	ULTRA
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58. [\[Foundation\]](#) Two adjacent angles form a linear pair. Their measures are $(3x + 20)^\circ$ and $(2x + 10)^\circ$. Find x and the two angles.
59. [\[Scoring\]](#) Prove that vertically opposite angles are equal.
60. [\[Foundation\]](#) Two parallel lines are cut by a transversal. If one angle in a pair of corresponding angles measures 65° , find the measure of the other corresponding angle.
61. [\[Foundation\]](#) Two parallel lines are cut by a transversal. If one alternate interior angle is 75° , find the other alternate interior angle.
62. [\[Scoring\]](#) If a pair of corresponding angles are equal, prove that the two lines are parallel.
63. [\[Scoring\]](#) If line l is parallel to line m and line m is parallel to line n , explain why line l is parallel to line n .
64. [\[Ultra\]](#) Using proof by contradiction, show that two distinct lines cannot have more than one common point.

☐ I understand the basics ☐ I can solve without help ☐ I can explain my method

Working / Notes

9. Triangles - Congruence Theorems

Unit IV - Geometry | 25 marks (across 5 chapters)

Focus: SSS, SAS, ASA, RHS, AAS, isosceles triangle properties, converses and the limits of SSA.

FOUNDATION	SCORING	ULTRA
65. [Foundation] If $AB = PQ$, $BC = QR$ and $AC = PR$, write the correct correspondence between triangles ABC and PQR and state the congruence rule.	66. [Scoring] In triangles ABC and DEF, $AB = DE$, $BC = EF$ and $AC = DF$. Prove that the triangles are congruent.	67. [Scoring] In triangles ABC and DEF, $AB = DE$, $BC = EF$ and $\angle B = \angle E$. Prove that the triangles are congruent using SAS.
68. [Scoring] In triangles ABC and DEF, $\angle A = \angle D$, $AB = DE$ and $\angle B = \angle E$. Prove that the triangles are congruent using ASA.	69. [Scoring] Two right triangles have equal hypotenuses and one corresponding leg equal. Prove that the triangles are congruent using RHS.	70. [Scoring] In triangles ABC and DEF, $\angle A = \angle D$, $\angle B = \angle E$ and $AC = DF$. Prove that the triangles are congruent using AAS.
71. [Ultra] In isosceles triangle ABC, $AB = AC$. Prove that $\angle B = \angle C$.	72. [Foundation] Triangles ABC and DEF are congruent. If $AC = DF$ and $AC = 12$ cm, find DF. State the property of congruent triangles that justifies your answer.	73. [Ultra] Prove the converse of the isosceles-triangle theorem: if $\angle B = \angle C$ in triangle ABC, then $AB = AC$.
74. [Ultra] In a triangle, one side opposite a 30° angle is 5 cm, and another side adjacent to the 30° angle is 7 cm. Show that two non-congruent triangles can be constructed. Explain why this demonstrates that SSA is not sufficient to prove triangle congruence.		

☐ I understand the basics ☐ I can solve without help ☐ I can explain my method

Working / Notes

10. 4-gons (Quadrilaterals)

Unit IV - Geometry | 25 marks (across 5 chapters)

Focus: Parallelogram properties and converses, midpoint theorem, medians, centroid, symmetry, tiling and coordinate reasoning.

FOUNDATION	SCORING	ULTRA
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75. [Foundation] Define a quadrilateral and explain the difference between a convex and non-convex quadrilateral.
76. [Scoring] Prove that the opposite sides of a parallelogram are equal.
77. [Scoring] Prove that the opposite angles of a parallelogram are equal.
78. [Scoring] Prove that the diagonals of a parallelogram bisect each other.
79. [Ultra] Prove that if both pairs of opposite sides of a quadrilateral are equal, then the quadrilateral is a parallelogram.
80. [Ultra] Prove the midpoint theorem: the line segment joining the midpoints of two sides of a triangle is parallel to the third side and is half as long as the third side.
81. [Ultra] Prove the converse of the midpoint theorem: if a line passes through the midpoint of one side of a triangle and is parallel to another side, then it bisects the third side.
82. [Ultra] Prove that the three medians of a triangle are concurrent and that the point of concurrence divides each median in the ratio 2:1, measured from the vertex.
83. [Ultra] Show that joining the midpoints of the four sides of any quadrilateral in order forms a parallelogram.
84. [Scoring] A(1, 2), B(5, 2) and C(7, 6) are three consecutive vertices of a parallelogram ABCD. Find the coordinates of D.
85. [Foundation] How many lines of symmetry does a square have? What is the order of rotational symmetry of a square? Name one other quadrilateral and state its lines of symmetry and order of rotational symmetry.
86. [Scoring] Explain how congruent copies of a quadrilateral can be arranged to tile the plane without gaps or overlaps.

☐ I understand the basics ☐ I can solve without help ☐ I can explain my method

Working / Notes

11. Circles

Unit IV - Geometry | 25 marks (across 5 chapters)

Focus: Chords, perpendicular bisectors, central and inscribed angles, cyclicity, same-segment theorem and circle constructions.

FOUNDATION	SCORING	ULTRA
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87. [Foundation] Define a diameter, chord and arc of a circle. Also define a sector and a segment of a circle.
88. [Scoring] Explain why three non-collinear points determine a unique circle.
89. [Scoring] Given a triangle ABC, describe the steps to construct its circumcircle and circumcentre.
90. [Scoring] State where the circumcentre lies for an acute-angled triangle, a right-angled triangle and an obtuse-angled triangle.
91. [Ultra] Prove that the perpendicular from the centre of a circle to a chord bisects the chord.
92. [Ultra] Prove that equal chords of a circle are equidistant from the centre.
93. [Scoring] Two chords of a circle are at perpendicular distances of 3 cm and 5 cm from the centre. Which chord is longer? Explain your reasoning.
94. [Ultra] Prove that the angle subtended by an arc at the centre of a circle is twice the angle subtended by the same arc at any point on the remaining part of the circumference.
95. [Ultra] Prove that angles subtended by the same chord in the same segment of a circle are equal.
96. [Scoring] AB is a diameter of a circle and C is any point on the circle other than A and B. Find $\angle ACB$ and state the theorem used.
97. [Ultra] In a cyclic quadrilateral ABCD, prove that the opposite angles $\angle ABC$ and $\angle ADC$ are supplementary. d explain the converse of this result.

☐ I understand the basics ☐ I can solve without help ☐ I can explain my method

Working / Notes

12. Area and Perimeter

Unit V - Mensuration | 14 marks (across 2 chapters)

Focus: Perimeter, arc length, areas of plane figures, Heron's formula, sectors, segments and Brahmagupta's formula.

FOUNDATION	SCORING	ULTRA
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98. **[Foundation]** A composite figure is made by joining a $10\text{ cm} \times 6\text{ cm}$ rectangle to a semicircle of diameter 6 cm along one of its 6 cm sides. Find the area and outer perimeter of the figure.
99. **[Foundation]** A circle has radius 7 cm . Find its circumference and the length of a 60° arc. Take $\pi = 22/7$.
100. **[Scoring]** Is e a rational or irrational number? What does this imply about its decimal expansion?
101. **[Scoring]** Explain how the area formula πr^2 can be understood by rearranging sectors of a circle.
102. **[Scoring]** A sector has radius 14 cm and central angle 90° . Find its area. Take $\pi = 22/7$.
103. **[Scoring]** A 90° sector is formed in a circle of radius 14 cm . Find the area of the corresponding minor segment. Take $\pi = 22/7$.
104. **[Scoring]** Explain why a median of a triangle divides the triangle into two regions of equal area.
105. **[Foundation]** Find the area of a triangle whose sides are 13 cm , 14 cm and 15 cm using Heron's formula.
106. **[Scoring]** A cyclic quadrilateral has consecutive sides 6 cm , 8 cm , 6 cm and 8 cm . Find its area using Brahmagupta's formula.
107. **[Ultra]** Explain how Brahmagupta's formula reduces to Heron's formula when one side length is taken as zero.

☐ I understand the basics ☐ I can solve without help ☐ I can explain my method

Working / Notes

13. Surface Area and Volume

Unit V - Mensuration | 14 marks (across 2 chapters)

Focus: Cuboids, cubes, cylinders, cones, pyramids, spheres and hemispheres.

FOUNDATION	SCORING	ULTRA
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108. **[Foundation]** A cuboid is 8 cm long, 5 cm wide and 3 cm high. Find its total surface area and volume.
109. **[Foundation]** Explain why a cube is a special case of a cuboid.
110. **[Foundation]** A cylinder has radius 7 cm and height 10 cm. Find its curved surface area, total surface area and volume. Take $\pi = 22/7$.
111. **[Scoring]** A cone has radius 6 cm and height 8 cm. Find its slant height, curved surface area and volume. Take $\pi = 22/7$.
112. **[Foundation]** A sphere has radius 7 cm. Find its surface area and volume. Take $\pi = 22/7$.
113. **[Scoring]** A hemispherical bowl has radius 6 cm. Find its capacity. Take $\pi = 22/7$.
114. **[Scoring]** A sphere has radius 3 cm and a cylinder has radius 3 cm and height 4 cm. Compare their volumes. Take $\pi = 22/7$.
115. **[Ultra]** A cylindrical tank has radius 2 m and height 5 m. Its radius is increased to 3 m while the height stays the same. Find the change in volume. Take $\pi = 22/7$.
116. **[Scoring]** A square-based pyramid has a square base of side 6 cm and a perpendicular height of 4 cm. Find its volume.

☐ I understand the basics ☐ I can solve without help ☐ I can explain my method

Working / Notes

14. Statistics

Unit VI - Statistics and Probability | 10 marks (across 2 chapters)

Focus: Graphs, mean, median, mode, weighted average, stacked bars and 100% stacked bars.

FOUNDATION	SCORING	ULTRA
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117. **[Foundation]** Find the mean, median, and mode of the data: 4, 7, 7, 9, 10, 12, 13.
118. **[Scoring]** In the data set 10, 12, 14, 18, 21, the value 18 is replaced by 24. Find the change in the mean.
119. **[Scoring]** The mean of six numbers is 12. Five of the numbers are 8, 11, 13, 15 and 10. Find the sixth number.
120. **[Scoring]** Twenty students have an average score of 70 and thirty students have an average score of 80. Find the combined average score.
121. **[Ultra]** Explain why the average of two group averages is not always equal to the overall average when the groups have different sizes.
122. **[Foundation]** A class has 20 boys and 15 girls. Another class has 18 boys and 22 girls. Draw a stacked bar graph for the two classes and state the total number of students in each class.
123. **[Scoring]** In Class A, 60% of students study Science and 40% study Humanities. In Class B, 45% study Science and 55% study Humanities. Draw a 100% stacked bar graph and compare the proportions.
124. **[Ultra]** For each situation, choose the most suitable type of graph from a line graph, bar graph, or 100% stacked bar graph, and explain why: (a) monthly rainfall, (b) favourite sports in a class, (c) percentage of boys and girls in different classes.

☐ I understand the basics ☐ I can solve without help ☐ I can explain my method

Working / Notes

15. Introduction to Probability

Unit VI - Statistics and Probability | 10 marks (across 2 chapters)

Focus: Randomness, probability scale, empirical and theoretical probability, sample space, events and tree diagrams.

FOUNDATION	SCORING	ULTRA
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125. [\[Foundation\]](#) Classify each event as impossible, less likely, equally likely, more likely or certain: (a) getting 7 on a standard die, (b) getting an even number on a standard die, (c) getting a number greater than 4 on a standard die, (d) getting a number less than 6 on a standard die, (e) getting a number from 1 to 6 on a standard die.
126. [\[Foundation\]](#) Write the sample space for tossing a fair coin once.
127. [\[Foundation\]](#) A fair coin is tossed and a standard die is rolled. Write the complete sample space.
128. [\[Foundation\]](#) A standard die is rolled once. Find the probability of getting an even number.
129. [\[Scoring\]](#) A coin is tossed 50 times and heads occur 28 times. Find the empirical probability of getting heads.
130. [\[Scoring\]](#) For a fair coin, the theoretical probability of heads is $\frac{1}{2}$. In 50 tosses, heads occur 28 times. Compare the empirical and theoretical probabilities and give one reason they may differ.
131. [\[Scoring\]](#) Two fair coins are tossed. Represent the experiment with a tree diagram and list all possible outcomes.
132. [\[Ultra\]](#) A bag contains 3 red balls and 2 blue balls. Two balls are drawn one after another without replacement. Draw a tree diagram and find the probability of getting two red balls.

☐ I understand the basics ☐ I can solve without help ☐ I can explain my method

Working / Notes

Final Checklist

- ☐ I can solve the Foundation questions from every chapter.
- ☐ I can write complete steps for geometry proofs.
- ☐ I can explain why a method works, not only get the answer.
- ☐ I can handle word problems and real-life applications.
- ☐ I have revised formulas, identities and key theorems.
- ☐ I have practised enough questions without looking at the solution.

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