

10th CBSE Important Questions 2027

MATHEMATICS (STANDARD)

Chapter-wise • Duplicate-screened against text-readable supplied papers
Reviewed against the 2026-27 CBSE syllabus

Source papers	Organization
Supplied CBSE Mathematics Standard papers from 2022, 2023, 2024, 2025 and 2026, including multiple set codes.	14 chapters and 144 questions in Class X chapter order.

How to use this booklet

- Attempt each question without looking at notes first. Mark questions you cannot complete and revisit the underlying concept.
- These are practice questions, not a prediction or guarantee of what will appear in the 2027 board examination.
- A few questions have been clarified, mathematically repaired, or syllabus-adapted; those edits are documented in the separate correction report rather than presented as verbatim source-paper transcriptions.

Syllabus audit

Reviewed against the official CBSE Class X Mathematics curriculum for 2026–27. The prescribed syllabus specifies internal section formula for Coordinate Geometry; Heights and Distances problems use 30° , 45° and 60° and no more than two right triangles; segment-area problems use central angles 60° , 90° and 120° . The revised wording removes the identified conflicts and clarifies assumptions where needed.

Official syllabus: [CBSE Class X Mathematics 2026–27 \(PDF\)](#)

The accompanying Correction Report contains the detailed change log and verification limits.

Chapter Index

Use this index to plan revision. Chapter-wise counts below match the questions in this corrected edition.

1. Real Numbers	10 questions
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Total questions: 144

1. Real Numbers

- 01.** Prove that $\sqrt{5}$ is irrational.
- 02.** Given that $\sqrt{7}$ is irrational, prove that $2\sqrt{7}$ is irrational.
- 03.** Prove that $3 + 2\sqrt{5}$ is irrational.
- 04.** Find the smallest positive number that is exactly divisible by both 644 and 462.
- 05.** Two positive integers are in the ratio 4 : 5 and their HCF is 11. Find their LCM.
- 06.** Find the greatest number that divides 37, 66 and 89 leaving remainders 2, 3 and 5 respectively.
- 07.** If the LCM of 51 and 85 is written in the form $6z - 9$, find z .
- 08.** Prove that $\text{HCF}(a, b) \times \text{LCM}(a, b) = ab$ for positive integers a and b .
- 09.** Give one rational number between $\sqrt{3}$ and $\sqrt{5}$.
- 10.** If two positive integers have prime factorizations $a = 2^2 \times 3 \times 5$ and $b = 2 \times 3^2 \times 7$, find their HCF and LCM.

2. Polynomials

- 01.** Find the zeroes of $p(x) = x^2 + 2x - 2$.
- 02.** If α and β are the zeroes of $p(x) = x^2 - ax - b$, find $\alpha + \beta + \alpha\beta$ in terms of a and b .
- 03.** If α and β are the zeroes of $p(x) = kx^2 - 30x + 45k$ and $\alpha + \beta = \alpha\beta$, find k . Assume $k \neq 0$.
- 04.** If the zeroes of $x^2 + ax + b$ are in the ratio $3 : 4$, prove that $12a^2 = 49b$.
- 05.** Let $\alpha = 3$ and $\beta = -1$ be the zeroes of $x^2 - 2x - 3$. Form a quadratic polynomial whose zeroes are $2\alpha + 3\beta$ and $3\alpha + 2\beta$.
- 06.** If α and β are the zeroes of $3x^2 + 6x + k$ and $\alpha + \beta + \alpha\beta = -4/3$, find k .
- 07.** For a quadratic polynomial $p(x) = ax^2 + bx + c$, state the relationship between its zeroes and its coefficients.
- 08.** A polynomial graph intersects the x -axis at exactly three distinct points. How many distinct real zeroes does the polynomial have?

3. Pair of Linear Equations in Two Variables

- 01.** A pair of linear equations is inconsistent when the two lines are: (a) coincident, (b) distinct and parallel, (c) intersecting at one point, or (d) perpendicular.
- 02.** For the pair $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$, state the conditions for (i) a unique solution, (ii) no solution, and (iii) infinitely many solutions.
- 03.** Find k so that the equations $6x + y = 3k$ and $36x + 6y = 3$ have infinitely many solutions.
- 04.** If $x = 1$ and $y = 2$ satisfy $2x - 3y + a = 0$ and $2x + 3y - b = 0$, find the relation between a and b .
- 05.** Solve graphically the pair $x = 3$ and $y = -4$. Also state the point of intersection.
- 06.** Draw the graphs of $x = 0$ and $y = -7$. Is the pair consistent? Give the number of solutions.
- 07.** The equations $9x - 15y + 19 = 0$ and $5y - 3x - 9 = 0$ represent two lines. Determine whether they intersect, are parallel, or coincide.
- 08.** Aarush buys 2 pencils and 3 chocolates for ₹11. Tanish buys 1 pencil and 2 chocolates for ₹7. Form a pair of linear equations and find the price of each item graphically.
- 09.** A person lends money partly at 10% per annum and the rest at 15% per annum. The total annual interest is ₹1,900. If the rates on the two amounts are interchanged, the interest becomes ₹2,100. Find the two amounts.
- 10.** Vijay invests money in schemes A and B at 8% and 9% annual interest respectively. The total annual interest is ₹1,860. If the amounts invested are interchanged, the interest increases by ₹20. Find the amount invested in each scheme.
- 11.** A two-digit number is equal to 7 times the sum of its digits plus 3. The same number is also equal to 19 times the difference between its tens digit and units digit, minus 1. If the tens digit is greater than the units digit, find the number.

4. Quadratic Equations

- 01.** A train covers 480 km at a uniform speed. If its speed were 8 km/h less, it would take 3 hours longer to cover the same distance. Find its original speed.
- 02.** The sum of the squares of two natural numbers is 29. The second number is one more than twice the first. Find the numbers.
- 03.** A photograph is 18 cm long and 12 cm wide. Each dimension is increased by x cm so that its area doubles. Form the quadratic equation and find x .
- 04.** In a class test, a student's marks in Mathematics and Science add to 30. If the Mathematics mark were 2 higher and the Science mark 3 lower, their product would be 210. Find all possible pairs of original marks.
- 05.** A two-digit number has digits whose product is 12. When 36 is added to the number, its digits are reversed. Find the number.
- 06.** Find the value(s) of k for which $4x^2 + kx + 1 = 0$ has real and equal roots.
- 07.** If the roots of $ax^2 + bx + c = 0$ are real and equal, what condition must its discriminant satisfy?
- 08.** If the roots of a quadratic equation are equal in magnitude but opposite in sign, what must be the coefficient of x ?
- 09.** Find the value of p if one zero of the quadratic polynomial $px^2 - 14x + 8$ is six times the other.
- 10.** If a quadratic equation has roots 5 and -3 , form the monic quadratic equation with integer coefficients.

5. Arithmetic Progressions

- 01.** Which term of the AP 21, 18, 15, ... is zero?
- 02.** The 11th term and the 13th term of an AP are 39 and 45 respectively. Find the common difference.
- 03.** If the 23rd term of an AP exceeds its 16th term by 21, find the common difference.
- 04.** If the sum of the first n terms of an AP is $S_n = 2n^2 + 5n$, find the common difference.
- 05.** If the sum of the first m terms of an AP is $S_m = 2m^2 + 3m$, find the second term.
- 06.** Find x if $2x$, $x + 10$ and $3x + 2$ are three consecutive terms of an AP.
- 07.** If $p - 1$, $p + 1$ and $2p + 3$ are in AP, find p .
- 08.** A school charity run starts with a 300 m round and increases each successive round by 50 m. Find the distance covered in the 10th round and the total distance for the first 10 rounds.
- 09.** A company's annual production follows an AP. It produces 270 units in year 4 and 510 units in the tenth year. Find the first-year production, the common difference and the production in year 6.
- 10.** A borrower repays ₹1,18,000 in monthly instalments. The first instalment is ₹1,000 and each later instalment increases by ₹100. Find the number of instalments.
- 11.** In a row, houses are numbered from 1 to 49. Find the house number x for which the sum of numbers of houses before x equals the sum of numbers of houses after x .
- 12.** 250 logs are stacked in rows: 22 logs in the bottom row, 21 in the next, 20 in the next, and so on, with each successive row containing one fewer log than the row below it. Every row contains at least one log. Find the number of rows used.

6. Triangles

- 01.** State and prove the Basic Proportionality Theorem (BPT).
- 02.** In two triangles ABC and DEF, $\angle B = \angle E$ and $\angle C = \angle F$. If $AB = 3DE$, determine whether the triangles are similar and whether they are congruent. Justify your answer.
- 03.** The perimeter of a right triangle is 60 cm and its hypotenuse is 25 cm. Find the lengths of the other two sides.
- 04.** In $\triangle ABC$, D lies strictly between B and C and $AD \perp BC$. If $AD^2 = BD \times DC$, prove that $\angle BAC = 90^\circ$.
[Challenge Practice]
- 05.** If two triangles have two corresponding angles equal, explain why the triangles are similar and state the criterion used.
- 06.** In $\triangle ABC$, $DE \parallel BC$, with D on AB and E on AC. If $AD = 3$ cm, $DB = 2$ cm and $AE = 4.5$ cm, find EC.
- 07.** If the corresponding sides of two triangles are proportional, state the similarity criterion and explain how it can be used to find an unknown side.

7. Coordinate Geometry

- 01.** Find the distance between the points $(4, p)$ and $(1, 0)$ if the distance is 5. Find all possible values of p .
- 02.** Find the coordinates of the point that divides the line segment joining $P(-1, 5)$ and $Q(5, 2)$ internally in the ratio $2 : 1$.
- 03.** The centre of a circle is $(2a, a - 7)$. The circle passes through $(11, -9)$ and has diameter $10\sqrt{2}$ units. Find the possible values of a .
- 04.** A rhombus PQRS has $P(2, -3)$, $Q(6, 5)$ and $R(-2, 1)$ as three consecutive vertices. Find S and the point where diagonals PR and QS intersect.
- 05.** Find the coordinates of the points of trisection of the line segment joining $A(1, 4)$ and $B(-3, 2)$.
- 06.** Find the ratio in which the y-axis divides the segment joining $A(5, -6)$ and $B(-1, -4)$. Also find the point of intersection.
- 07.** M lies on the y-axis, 4 units below the x-axis. Find the distance between M and $Q(5, 1)$.
- 08.** Find the distance between $(0, 2\sqrt{5})$ and $(2\sqrt{5}, 0)$.
- 09.** Find the distance of $A(4a, 3a)$ from the x-axis, assuming a is positive.
- 10.** P is the midpoint of the segment joining $A(3, 4)$ and $B(k, 6)$. If P lies on $x + y - 10 = 0$, find k .
- 11.** A rectangle AOBC has vertices $A(0, 2)$, $O(0, 0)$ and $B(4, 0)$. Find the square of the length of its diagonal.

8. Introduction to Trigonometry

- 01.** If $\cos A = 3/5$ and A is acute, find $\tan A$.
- 02.** If $\tan A = 3/4$ and A is acute, find $\sin A$ and $\cos A$.
- 03.** Express $\cos A$ and $\tan A$ in terms of $\sin A$, assuming A is an acute angle.
- 04.** If $\cot \theta = 2$ and θ is acute, find $\sin \theta$.
- 05.** If $\tan A + \cot A = 6$, find $\tan^2 A + \cot^2 A - 4$.
- 06.** If $2 \sin A = 1$ and A is acute, find $\tan A + \cot A$.
- 07.** In a right triangle, $\cos B = 1/\sqrt{5}$. Find $\cot B$.
- 08.** Prove the identity $\sin^2 A + \cos^2 A = 1$.
- 09.** If $\sin A = 3/5$ and A is acute, find $\cos A$, $\tan A$ and $\cot A$.
- 10.** If $\tan A = \sqrt{2} - 1$, prove that $\tan A/(1 + \tan^2 A) = \sqrt{2}/4$.
- 11.** Simplify $\cot \theta + \tan \theta$ in terms of $\sec \theta$ and $\operatorname{cosec} \theta$.
- 12.** Write the exact values of $\sin$, $\cos$ and $\tan$ for 30° , 45° and 60° (where defined).

9. Some Applications of Trigonometry

- 01.** From a point on the ground 60 m from the foot of a vertical tower, the angle of elevation of its top is 45° . Find the height of the tower.
- 02.** A kite is 150 m above level ground. A person standing on the ground holds its taut string, which makes an angle of 30° with the horizontal. Neglect the person's height. Find the length of the string.
- 03.** A ladder 14 m long leans against a wall, with its foot 7 m from the wall. Find the angle the ladder makes with the ground.
- 04.** The length of a tower's shadow is equal to the tower's height. Find the Sun's angle of elevation.
- 05.** Raina is 1.5 m tall and casts a shadow 1.5 m long. At the same time, a pole casts a shadow 9 m long. Find the pole's height.
- 06.** A pole 18 m high casts a shadow when the Sun's angle of elevation is θ , where $\tan \theta = \sqrt{3}$. Find the length of the shadow.
- 07.** Two vertical towers stand on level horizontal ground. The angle of elevation of the top of a 24 m tower from the foot of a second tower is 60° . The angle of elevation of the top of the second tower from the foot of the first tower is 30° . Find the distance between the towers and the height of the second tower.
- 08.** A car approaches a building along a straight, level road. From the top of the building, the angles of depression of the car at two observations are 30° and 60° , respectively. The observations are 6 seconds apart, and at the second observation the car is 25 m from the building. Find the building's height and the car's speed, assuming uniform motion.
- 09.** A bird flies at a constant speed along a straight horizontal line passing directly above an observer, maintaining a height of 100 m. The observer sees the bird at an angle of elevation of 30° when it is east of the observer and, 2 minutes later, at an angle of elevation of 45° when it is west of the observer. Find the bird's speed.
- 10.** A lighthouse is 50 m high. A ship moves in a straight line directly toward the lighthouse. From the top of the lighthouse, the angles of depression of the ship at its two positions are 30° and 45° , respectively. Find the distance travelled by the ship between these positions.

10. Circles

01. Prove that the tangent at any point of a circle is perpendicular to the radius through the point of contact.

02. Prove that the lengths of tangents drawn from an external point to a circle are equal.

03. Prove that the tangents drawn at the endpoints of a diameter of a circle are parallel.

[Challenge Practice]

04. Tangents PA and PB from external point P make an angle of 80° with each other. O is the centre. Find $\angle POA$.

05. PA and PB are tangents to a circle with centre O. If $\angle AOB = 130^\circ$, find $\angle APB$.

06. A person is 26 m from the centre of a circular ground. The two tangents from the person to the ground are each 10 m long. Find the radius of the ground.

07. AB is a chord of a circle of length 24 cm and is 5 cm from the centre O. PB is a tangent at B of length 20 cm. Find OP.

08. In a circle, PA and PB are tangents from an external point P. Prove that quadrilateral PAOB is cyclic, where O is the centre.

[Challenge Practice]

09. A convex quadrilateral ABCD circumscribes a circle with centre O. Prove that $\angle AOB + \angle COD = 180^\circ$ and $\angle BOC + \angle DOA = 180^\circ$.

[Challenge Practice]

10. Two radii OA and OB of a circle are perpendicular. The tangents at A and B meet at T. Prove that $AB = OT$ and that the segments AB and OT bisect each other.

[Challenge Practice]

11. A convex hexagon ABCDEF circumscribes a circle. Prove that $AB + CD + EF = BC + DE + FA$.

[Challenge Practice]

12. Two parallel tangents touch a circle at A and B. A third tangent meets them at P and Q. Prove that $\angle POQ = 90^\circ$, where O is the centre.

[Challenge Practice]

11. Areas Related to Circles

- 01.** A chord of a circle of radius 10 cm subtends 90° at the centre. Find the area of the corresponding minor segment. Use $\pi = 3.14$.
- 02.** A chord of a circle of radius 14 cm subtends 60° at the centre. Find the areas of the minor and major segments.
- 03.** Find the length of the arc and the area of the minor segment of a circle of radius 21 cm subtending 60° at the centre.
- 04.** Find the area of the sector of a circle of radius 42 cm with central angle 30° . Also find the area of the corresponding major sector.
- 05.** The perimeter of a major sector of a circle of radius 15 cm is 80 cm. Find the area of the major sector.
- 06.** Sector A has twice the radius of sector B, while sector B has twice the central angle of sector A. Find the ratio of their areas.
- 07.** An arc is 5π cm long and the sector it bounds has area 20π cm². Find the radius of the circle.
- 08.** A sector of a circle of radius 36 cm has area 54π cm². Find the length of its arc.
- 09.** Find the area of the segment cut off by a chord that subtends 120° at the centre of a circle of radius 21 cm. Use $\pi = \frac{22}{7}$ and leave any $\sqrt{3}$ term exact.
- 10.** If the numerical value of the area of a circle is equal to the numerical value of the perimeter of a semicircle with the same radius, when lengths are expressed in centimetres and areas in square centimetres, form an equation and find the positive radius.

12. Surface Areas and Volumes

- 01.** The volumes of two cubes are in the ratio 8 : 125. Find the ratio of their total surface areas.
- 02.** A solid cylinder of radius 7 cm and height 30 cm has a conical cavity of radius 7 cm and height 24 cm hollowed out. Find the total surface area of the remaining solid.
- 03.** A solid toy is a hemisphere surmounted by a cone. The cone has height 2 cm and the common base has diameter 4 cm. Find the volume and exposed surface area of the toy. Use $\pi = 3.14$.
- 04.** The base radii of a cylinder and a cone are in the ratio 3 : 4 and their heights are in the ratio 2 : 3. Find the ratio of their volumes.
- 05.** A cylindrical cap is surmounted by a hemispherical top of the same radius. If the volumes of the cylindrical and hemispherical parts are equal, find the ratio of the cylinder height to the radius.
- 06.** A cone and a sphere have the same radius and equal volumes. Find the height of the cone in terms of the radius r .
- 07.** Two cubes of side 4 cm are joined face-to-face to make a cuboid. Find the total surface area of the resulting solid.
- 08.** A cone and a cylinder have equal radii and equal curved surface areas. Find the ratio of the cone's slant height to the cylinder's height.
- 09.** An inverted cone of height 8 cm and top radius 5 cm is full of water. Solid spheres of radius 0.5 cm are dropped into the cone and become fully submerged, causing one-fourth of the initial water volume to overflow. Find the number of spheres dropped in.
- 10.** A greenhouse has a cylindrical wall of height 2 m and diameter 12 m, with a hemispherical dome on top. Find the outside curved area to be covered, excluding the floor.
- 11.** A hemispherical metal bowl has outer radius 6 cm and thickness 1 cm. Find the volume of metal.

13. Statistics

- 01.** The monthly electricity consumption of 68 consumers is grouped below. Find the mean and mode. Class interval (units): 65–85, 85–105, 105–125, 125–145, 145–165, 165–185, 185–205. Frequency: 4, 5, 13, 20, 14, 8, 4.
- 02.** A health centre records patients' ages as follows: 0–15: 8; 15–30: 5; 30–45: x ; 45–60: 16; 60–75: 12; 75–90: 9. If the modal age is 54 years, find x .
- 03.** Weekly expenditure on Ayurvedic medicines is grouped as follows: ₹100–150: 4 households; ₹150–200: 5; ₹200–250: y ; ₹250–300: 2; ₹300–350: 2. If the mean expenditure is ₹211, find y .
- 04.** The daily wages of 110 workers are grouped as follows: ₹100–120: 10; ₹120–140: 15; ₹140–160: 20; ₹160–180: 22; ₹180–200: 18; ₹200–220: 12; ₹220–240: 13. Calculate the mean and modal daily wages.
- 05.** The lengths of 40 leaves are grouped as follows (length in mm : frequency): 118–126: 3; 127–135: 5; 136–144: 9; 145–153: 12; 154–162: 5; 163–171: 4; 172–180: 2. Convert the inclusive class intervals to continuous class intervals before calculating the median length.
- 06.** For grouped data, explain how to identify the median class and the modal class from a frequency table. Can these classes ever be the same? Justify.

14. Probability

- 01.** A die is thrown once. Find the probability of getting a number that is not a factor of 36.
- 02.** Two dice are thrown simultaneously. Find the probability that the absolute difference between the numbers shown is 2.
- 03.** Two dice are thrown. Find the probabilities that (i) their sum is 5 and (ii) the absolute difference between the two numbers is 3.
- 04.** Two dice are thrown together. Find the probability that the product of the numbers shown is less than 6.
- 05.** Two dice are rolled. Find the probability that the product of the numbers shown is a perfect square.
- 06.** A card is drawn from a well-shuffled standard pack of 52 cards. Find the probability that it is a spade or a king.
- 07.** All spade face cards ($J\spadesuit$, $Q\spadesuit$ and $K\spadesuit$) are removed from a standard pack. A card is drawn from the remaining cards. Find the probability of getting (i) a face card and (ii) an ace or a jack.
- 08.** Three unbiased coins are tossed simultaneously. Find the probability of getting (i) exactly two tails, (ii) at least one head and (iii) at most two heads.
- 09.** Of a group of 20 people, 5 cannot swim. If one person is selected at random, find the probability that the person can swim.
- 10.** Assuming the player can only win or lose the game, if the probability of winning is 0.21, find the probability of losing.
- 11.** In a bag there are 4 red, 3 blue and 2 yellow balls. One ball is drawn at random. Find the probability of drawing (i) a red ball and (ii) a yellow ball.
- 12.** If 65% of a population has black eyes and 25% has brown eyes, with the rest having blue eyes, find the probability that a randomly selected person has (i) blue eyes and (ii) brown or black eyes.
- 13.** A number is selected at random from 1 to 25 inclusive. Find the probability that it is a composite number.
- 14.** Two fair dice are thrown simultaneously. Find the probability that one die shows a multiple of 2 and the other shows a multiple of 3. Consider both possible orders, including the outcome in which both dice show 6.

Final syllabus reminder

This booklet is a practice question bank, not a prediction of the board paper. Check official CBSE updates and school instructions before final revision.



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