CBSE · CLASS 10 · MATHEMATICS (STANDARD)

CBSE Class 10 Mathematics (Standard) Important Questions 2027

61 question patterns that repeated across past papers · the years show every time each was asked

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Real Numbers

1. Compute HCF/LCM of two numbers

Asked 3× · Board 2025, Board 2026, Sample 2025 · 1/2 marks

The LCM of 960 and 240 is : (A) 960 (B) 240 (C) 60 (D) 15

2. Prove sqrt(p) is irrational

Asked 3× · Board 2023, Board 2026, Sample 2025 · 3 marks

Prove that sqrt(5) is an irrational number.

3. Units digit of 5^n

Asked 2× · Board 2026, Sample 2026 · 1 marks

For any natural number n, 5^n ends with the digit : (A) 0 (B) 5 (C) 3 (D) 2

4. Minimum equal rooms/groups via HCF

Asked 2× · Board 2024, Sample 2026 · 3 marks

In a workshop, the number of teachers of English, Hindi and Science are 36, 60 and 84 respectively. Find the minimum number of rooms required, if in each room the same number of teachers are to be seated and all of them being of the same subject.

Polynomials

5. Find unknown coefficient from condition on zeroes

Asked 3× · Board 2024, Board 2025, Board 2026 · 1 marks

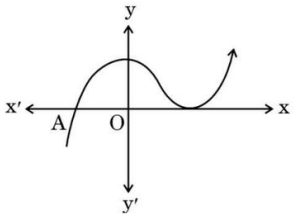
If alpha and beta are two zeroes of a polynomial $f(x) = px^2 - 2x + 3p$ and alpha + beta = alpha*beta, then value of p is : (A) -2/3 (B) 2/3 (C) 1/3 (D) -1/3

6. Count zeroes from graph

Asked 3× · Board 2023, Board 2025, Board 2026 · 1 marks

The graph of y = f(x) is given. The number of distinct zeroes of y = f(x) is : (A) 0 (B) 1 (C) 2 (D) 3
[Figure: curve crossing x-axis at A and touching it at another point]

4. The graph of $y = f(x)$ is given. The number of distinct zeroes of $y = f(x)$ is :



(A) 0 (B) 1

(C) 2 (D) 3

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7. Find zeroes by factorisation (and verify)

Asked 2× · Board 2025, Sample 2026 · 2/3 marks

Find the zeroes of the quadratic polynomial $2x^2$ - (1 + 2*sqrt(2))x + sqrt(2) and verify the relationship between the zeroes and coefficients of the polynomial.

8. Identify quadratic with given plus/minus zeroes

Asked 2× · Board 2023, Sample 2025 · 1 marks

A quadratic polynomial having zeroes -sqrt(5/2) and sqrt(5/2) is A) x^2 - 5*sqrt(2)x + 1 B) $8x^2$ - 20 C) $15x^2$ - 6 D) x^2 - 2*sqrt(5)x - 1

9. Evaluate symmetric expression in zeroes

Asked 2× · Board 2023, Board 2026 · 1/2 marks

If alpha, beta are the zeroes of the quadratic polynomial px^2 + qx + r, then find the value of $alpha^3$ * beta + $beta^3$ * alpha.

Pair of Linear Equations in Two Variables

10. Solve a pair graphically

Asked 3× · Board 2026, Sample 2025, Sample 2026 · 3/5 marks

Aarush bought 2 pencils and 3 chocolates for Rs 11 and Tanish bought 1 pencil and 2 chocolates for Rs 7 from the same shop. Represent this situation in the form of a pair of linear equations. Find the price of 1 pencil and 1 chocolate, graphically.

11. Find k from coefficient-ratio conditions

Asked 3× · Board 2023, Sample 2025, Sample 2026 · 1 marks

If the lines given by 3x + 2ky = 2 and 2x + 5y + 1 = 0 are not parallel, then k has to be (A) 15/4 (B) not equal to 15/4 (C) any rational number (D) any rational number having 4 as denominator

Quadratic Equations

12. Fixed total with changed rate (D/x - D/(x+a) = b)

Asked 2× · Board 2025, Board 2026 · 5 marks

A person on a tour has Rs 4,200 for expenses. If he extends his tour for 3 days, he has to cut down his daily expenses by Rs 70. Find the original duration of the tour.

13. Form quadratic equation from area context

Asked 2× · Board 2023, Board 2024 · 1 marks

[case context: A rectangular floor can be tiled with 200 square tiles; if each tile's side is increased by 1 unit, only 128 tiles are needed.] Assuming the original length of each side of a tile is x units, make a quadratic equation from the above information.

14. Write quadratic in standard form from case context

Asked 2× · Board 2023, Board 2024 · 1 marks

[case context: A rectangular floor can be tiled with 200 square tiles; if each tile's side is increased by 1 unit, only 128 tiles are needed.] Write the corresponding quadratic equation in standard form.

Arithmetic Progressions

15. Direct a_n computation in a real-life context

Asked 5× · Board 2025, Board 2026, Sample 2026 · 1 marks

[case context: elder brother repays a bank loan of Rs 1,18,000 in monthly instalments starting at Rs 1,000 and increasing by Rs 100 every month (an AP)] Find the amount paid by him in the 30th instalment.

16. Direct S_n given first term and common difference

Asked 5× · Board 2022, Board 2025, Sample 2025, Sample 2026 · 2 marks

[case context: Teacher asks students to write examples of A.P.; Aryan writes -5, -2, 1, 4, ... and Roshan writes 187, 184, 181, ...] Find the sum of first 10 terms of the progression written by Aryan.

17. Recover terms from polynomial S_n

Asked 2× · Board 2022, Board 2025 · 1/2 marks

If the sum of first m terms of an AP is $2m^2 + 3m$, then its second term is : (A) 10 (B) 9 (C) 12 (D) 4

Triangles

18. Prove the Basic Proportionality Theorem

Asked 4× · Board 2023, Board 2024, Board 2026, Sample 2026 · 5 marks

Prove that if a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, then the other two sides are divided in the same ratio.

19. Medians of similar triangles are proportional

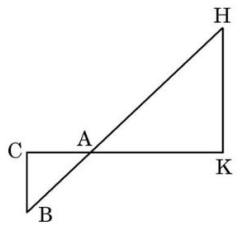
Asked 2× · Sample 2025, Sample 2026 · 2 marks

If AP and DQ are medians of triangles ABC and DEF respectively, where triangle ABC ~ triangle DEF, then prove that AB/DE = AP/DQ

20. Compute length/perimeter via corresponding side ratios

Asked 2× · Board 2026, Sample 2026 · 1/2 marks

In the given figure, triangle AHK ~ triangle ABC. If AK = 10 cm, BC = 3.5 cm and HK = 7 cm, find the length of AC.



OR

Coordinate Geometry

21. Point dividing segment in a given ratio

Asked 2× · Sample 2025, Sample 2026 · 1/2 marks

[case context: Class X students on picnic; positions of friends shown as points P(2,5), Q(4,4), R(8,3)] Let S be a point which divides the line joining PQ in ratio 2:3. Find the coordinates of S.

22. Perpendicular distance of a point from an axis

Asked 2× · Board 2026, Sample 2026 · 1 marks

The distance of the point A(4a, 3a) from x-axis is : (A) 3a (B) -3a (C) 4a (D) -4a

23. Find ratio of division (by axis or given point)

Asked 3× · Board 2023, Board 2024, Board 2025 · 1/3 marks

Find the ratio in which the y-axis divides the line segment joining the points (5, -6) and (-1, -4). Also find the point of intersection.

24. Distance between two given points

Asked 2× · Board 2023, Sample 2026 · 1 marks

[case context: Class X students on picnic; positions of friends Aman, Kirti, Chahat shown as points P(2,5), Q(4,4), R(8,3) on a coordinate grid] Find the distance between P and R.

25. Unknown coordinate from given distance

Asked 2× · Board 2024, Sample 2025 · 1/2 marks

Find the point(s) on the x-axis which is at a distance of sqrt(41) units from the point (8, -5).

Introduction to Trigonometry

26. Evaluate numeric expression at standard angles

Asked 4× · Board 2023, Board 2024, Board 2025, Sample 2025 · 1/2 marks

Evaluate : $\tan^2$ 60 deg / ($\sin^2$ 60 deg + $\cos^2$ 30 deg)

27. Solve linear trig equation for the angle

Asked 2× · Board 2025, Sample 2026 · 1 marks

If 2sin(5x) = sqrt(3), 0 <= x <= 90 degrees, then x is equal to (A) 10 deg (B) 12 deg (C) 20 deg (D) 50 deg

28. sec+tan and sec-tan are reciprocals

Asked 2× · Board 2024, Sample 2026 · 1 marks

If sec(theta) + tan(theta) = x, then sec(theta) - tan(theta) will be (A) x (B) x^2 (C) 2/x (D) 1/x

29. sin + cos = sqrt(3): square and derive

Asked 2× · Board 2023, Sample 2026 · 2/3 marks

If sin(theta) + cos(theta) = sqrt(3), then prove that tan(theta) + cot(theta) = 1

30. Rationalising fraction identity via $\sec^2$-$\tan^2$ / cosec^2-$\cot^2$ = 1

Asked 2× · Board 2023, Sample 2026 · 3 marks

Prove that (cosA - sinA + 1)/(cosA + sinA - 1) = cosecA + cotA

31. Evaluate (a sin + b cos)/(a sin - b cos) given tan

Asked 2× · Board 2023, Sample 2025 · 1 marks

If tan(theta) = 5/2 then (4 sin(theta) + cos(theta)) / (4 sin(theta) - cos(theta)) is equal to A) 11/9 B) 3/2 C) 9/11 D) 4

32. Prove tan/(1-cot) + cot/(1-tan) = 1 + sec.cosec

Asked 2× · Board 2024, Board 2025 · 3 marks

Prove that : tan theta/(1 - cot theta) + cot theta/(1 - tan theta) = 1 + sec theta cosec theta

Some Applications of Trigonometry

33. Two positions with changing angle (30/45/60)

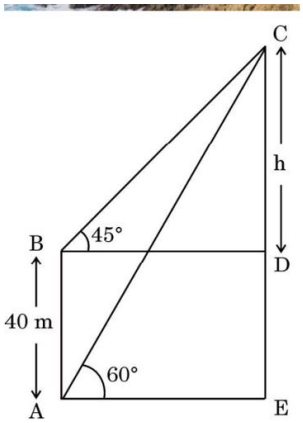
Asked 3× · Board 2026, Sample 2025, Sample 2026 · 1/2/5 marks

[case context: Tejas on top of a building observes a car approaching at uniform speed; angle of depression changes from 30 degrees to 60 degrees in 6 seconds, and at 60 degrees the car is 25 m from the building] What is the distance between the two positions of the car ?

34. One-ratio slant distance conversion

Asked 3× · Board 2025, Board 2026 · 1/2 marks

[case context: Amrita sees top of a lighthouse at elevation 60 deg from ground; from an observation deck 40 m higher the elevation is 45 deg; figure with A ground point, B deck, C top, h = CD] Find distance BC in terms of 'h'.



Based on the above given information, answer the following questions :

35. One-step tan: find height or distance

Asked 2× · Board 2026, Sample 2026 · 1 marks

From a point on the ground, which is 60 m away from the foot of a vertical tower, the angle of elevation of the top of the tower is found to be 45 degrees. The height (in metres) of the tower is : (A) 10 sqrt(3) (B) 30 sqrt(3) (C) 60 (D) 30

36. Mutual elevations between two structures

Asked 2× · Board 2022, Board 2023 · 3/5 marks

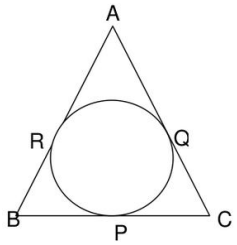
The angle of elevation of the top of a tower 24 m high from the foot of another tower in the same plane is 60 degrees. The angle of elevation of the top of second tower from the foot of the first tower is 30 degrees. Find the distance between two towers and the height of the other tower. Also, find the length of the wire attached to the tops of both the towers.

Circles

37. Prove equal tangents theorem

Asked 2× · Board 2026, Sample 2025 · 3/5 marks

Prove that the lengths of tangents drawn from an external point to a circle are equal. Using above result, find the length BC of triangle ABC. Given that, a circle is inscribed in triangle ABC touching the sides AB, BC and CA at R, P and Q respectively and AB = 10 cm, AQ = 7 cm, CQ = 5 cm.

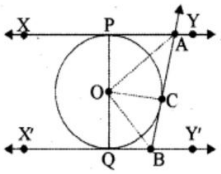


38. Tangent between two parallel tangents subtends 90 at centre

Asked 2× · Board 2024, Sample 2026 · 3 marks

In Figure, XY and X'Y' are two parallel tangents to a circle with centre O and another tangent AB with point of contact C intersecting XY at A and X'Y' at B. Prove that angle AOB = 90 degrees. [For Visually Impaired candidates: Two tangents PA and PB are drawn to a circle with centre O from an external point P. Prove that angle APB = 2(angle OAB)]

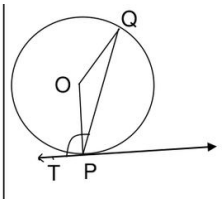
(Section – C)
Section C consists of 6 questions of 3 marks each.

26.	In Figure, XY and X'Y' are two parallel tangents to a circle with centre O and another tangent AB with point of contact C intersecting XY at A and X'Y' at B. Prove that ∠ AOB = 90°  **For Visually Impaired candidates:**	3

39. Tangent-chord angle vs central angle MCQ

Asked 2× · Board 2023, Sample 2025 · 1 marks

In the given figure, a tangent has been drawn at a point P on the circle centred at O. If angle TPQ = 110 deg then angle POQ is equal to A) 110 deg B) 70 deg C) 140 deg D) 55 deg

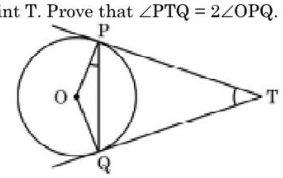


40. Prove angle PTQ = 2 angle OPQ

Asked 2× · Board 2023, Board 2026 · 3 marks

Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that angle PTQ = 2 angle OPQ.

29. (a) Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that ∠PTQ = 2∠OPQ.



41. Tangents at ends of a diameter are parallel

Asked 2× · Board 2024, Board 2025 · 1 marks

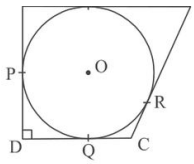
The tangents drawn at the extremities of the diameter of a circle are always : (A) parallel (B) perpendicular (C) equal (D) intersecting

42. Incircle in quadrilateral with one right angle

Asked 2× · Board 2023, Board 2024 · 3 marks

A circle with centre O and radius 8 cm is inscribed in a quadrilateral ABCD in which P, Q, R, S are the points of contact as shown. If AD is perpendicular to DC, BC = 30 cm and BS = 24 cm, then find the length DC.

(D) A circle with centre O and radius 8 cm is inscribed in a quadrilateral ABCD in which P, Q, R, S are the points of contact as shown. If AD is perpendicular to DC, BC = 30 cm and BS = 24 cm, then find the length DC.



3

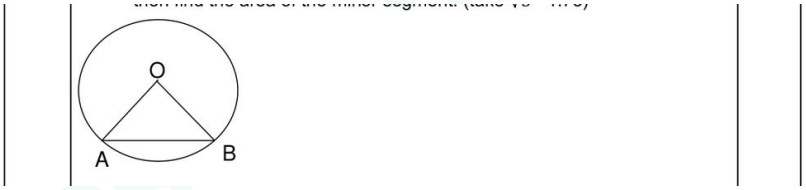
31. The difference between the outer and inner radii of a hollow right circular cylinder of length 14 cm is 1 cm. If the volume of the metal used in making the cylinder is 176 cm^3, find the outer and inner radii

Areas Related to Circles

43. Segment area = sector minus triangle

Asked 5× · Board 2023, Board 2024, Board 2026, Sample 2025, Sample 2026 · 1/2/3/5 marks

AB is a chord of a circle centred at O such that angle AOB = 60 deg. If OA = 14 cm then find the area of the minor segment. (take sqrt(3) = 1.73)



44. Sector area from radius and angle

Asked 2× · Board 2025, Board 2026 · 2/3 marks

Find the area of the sector of a circle of radius 42 cm and of central angle 30 degrees. Also, find the area of the corresponding major sector. [Use pi = 22/7]

Surface Areas and Volumes

45. Ice-cream volume: cone partly unfilled plus hemisphere top

Asked 2× · Board 2023, Sample 2026 · 3/5 marks

An empty cone of radius 3cm and height 12cm is filled with ice-cream such that the lower part of the cone which is (1/6)th of the volume of the cone is unfilled (empty) but a hemisphere is formed on the top. Find the volume of the ice-cream.

46. Surface area of remaining solid after hollowing

Asked 2× · Board 2022, Sample 2026 · 4/5 marks

From a solid right circular cone, whose height is 6cm and radius of base is 12cm, a right circular cylindrical cavity of height 3cm and radius 4cm is hollowed out such that bases of cone and cylinder form concentric circles. Find the surface area of the remaining solid in terms of pi.

47. Curved surface area of a cone from radius and height

Asked 2× · Board 2023, Sample 2025 · 1 marks

[case context] Silo = cylinder (r 1.5 m, h 7 m) + cone (r 1.5 m, h 2 m) on top. (ii) Find the curved surface area of the conical part of one silo.

48. Room as cylinder plus hemispherical dome given air volume

Asked 2× · Board 2023, Board 2025 · 3 marks

A room is in the form of a cylinder surmounted by a hemispherical dome. The base radius of the hemisphere is half of the height of the cylindrical part. If the room contains 1408/21 m^3 of air, find the height of the cylindrical part. (Use pi = 22/7).

Statistics

49. Missing frequency from one measure, then compute another

Asked 2× · Board 2025, Sample 2026 · 5 marks

If the mode of the following distribution is 55, then find the value of x. Hence, find the mean. Class Interval: 0-15, 15-30, 30-45, 45-60, 60-75, 75-90; Frequency: 10, 7, x, 15, 10, 12

50. Effect of adding a constant to every observation

Asked 2× · Board 2023, Sample 2026 · 1 marks

The median of a set of 9 distinct observations is 20.5. If each of the observations of the set is increased by 2, then the median of the new set (A) is increased by 2 (B) is decreased by 2 (C) is two times the original number (D) Remains same as that of original observations

51. Definition of median

Asked 2× · Board 2024, Sample 2025 · 1 marks

Which of the following gives the middle most observation of the data? A) Median B) Mean C) Range D) Mode

52. Identify the median class

Asked 2× · Board 2024, Sample 2025 · 1 marks

Consider the frequency distribution of 45 observations. Class: 0-10, 10-20, 20-30, 30-40, 40-50; Frequency: 5, 9, 15, 10, 6. The upper limit of median class is A) 20 B) 10 C) 30 D) 40

53. Empirical formula: third measure from other two

Asked 2× · Board 2025, Board 2026 · 1 marks

The mean and median of a frequency distribution are 43 and 43.4 respectively. The mode of the distribution is : (A) 43.4 (B) 42.4 (C) 44.2 (D) 49.3

54. Median of a grouped frequency table

Asked 2× · Board 2023, Board 2024 · 2 marks

[case context: BINGO game with 75 numbered balls; grouped frequency table of 48 announced numbers in classes 0-15(8), 15-30(9), 30-45(10), 45-60(12), 60-75(9).] Find median of the given data.

55. Mode of a grouped frequency table

Asked 2× · Board 2022, Board 2024 · 2 marks

[case context: BINGO game with 75 numbered balls; grouped frequency table of 48 announced numbers in classes 0-15(8), 15-30(9), 30-45(10), 45-60(12), 60-75(9).] Find mode of the given data.

56. Mean of a grouped frequency table

Asked 2× · Board 2022, Board 2023 · 2/3 marks

[case context: IMD table of sub-division wise monsoon rainfall (mm) in 2018 - classes 200-400 to 1600-1800 with frequencies 2,4,7,4,2,3,1,1] Find the mean rainfall in this season.

Probability

57. Two dice: sum/difference event

Asked 4× · Board 2024, Board 2025, Board 2026, Sample 2026 · 1/3 marks

Two dice are thrown at the same time. Determine the probability that the (i) sum of the numbers on the two dice is 5, and (ii) difference of the numbers on the two dice is 3.

58. Draw from a group: favourable/total

Asked 3× · Board 2023, Sample 2025 · 1/2 marks

In a bag containing 24 balls, 4 are blue, 11 are green and the rest are white. One ball is drawn at random. The probability that drawn ball is white in colour is A) 1/6 B) 3/8 C) 11/24 D) 5/8

59. Red face card from full deck

Asked 2× · Board 2025, Sample 2025 · 1 marks

A card is selected at random from a deck of 52 playing cards. The probability of it being a red face card is : (A) 3/13 (B) 2/13 (C) 1/2 (D) 3/26

60. Number with a property from 1..N

Asked 2× · Board 2024, Board 2026 · 1 marks

The probability for a randomly selected number out of 1, 2, 3, 4, ..., 25 to be a composite number is : (A) 15/25 (B) 10/25 (C) 11/25 (D) 9/25

61. Complement rule p + q = 1

Asked 2× · Board 2023, Board 2024 · 1 marks

If the probability of a player winning a game is 0.79, then the probability of his losing the same game is: (a) 1.79 (b) 0.31 (c) 0.21% (d) 0.21

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