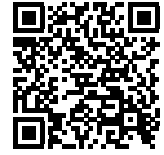




CBSE · CLASS 10 · MATHEMATICS (STANDARD)

# 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 3x · 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 3x · Board 2023, Board 2026, Sample 2025 · 3 marks

Prove that  $\sqrt{5}$  is an irrational number.

### 3. Units digit of $5^n$

Asked 2x · 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 2x · 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 3x · Board 2024, Board 2025, Board 2026 · 1 marks

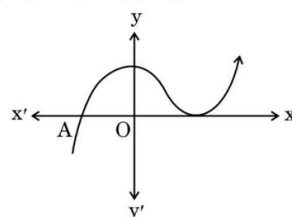
If  $\alpha$  and  $\beta$  are two zeroes of a polynomial  $f(x) = px^2 - 2x + 3p$  and  $\alpha + \beta = \alpha\beta$ , then value of  $p$  is : (A)  $-2/3$  (B)  $2/3$  (C)  $1/3$  (D)  $-1/3$

### 6. Count zeroes from graph

Asked 3x · 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]

7. 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

**7. Find zeroes by factorisation (and verify)**

Asked 2x · 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 2x · 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 2x · 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  $\alpha^3 \cdot \beta + \beta^3 \cdot \alpha$ .

**Pair of Linear Equations in Two Variables****10. Solve a pair graphically**

Asked 3x · 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 3x · 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 2x · 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 2x · 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 2x · 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 5x · 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 5x · 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 2x · 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 4x · 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**

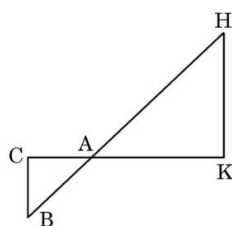
Asked 2x · Sample 2025, Sample 2026 · 2 marks

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 2x · 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 2x · 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 2x · 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 3x · 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 2x · 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 2x · 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 4x · Board 2023, Board 2024, Board 2025, Sample 2025 · 1/2 marks

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

**27. Solve linear trig equation for the angle**

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

If  $2\sin(5x) = \sqrt{3}$ ,  $0 \leq x \leq 90^\circ$ , then x is equal to (A)  $10^\circ$  (B)  $12^\circ$  (C)  $20^\circ$  (D)  $50^\circ$

**28. sec+tan and sec-tan are reciprocals**

Asked 2x · 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 2x · 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  $\sec^2 \tan^2 / \operatorname{cosec}^2 \cot^2 = 1$** 

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

Prove that  $(\cos A - \sin A + 1)/(\cos A + \sin A - 1) = \operatorname{cosec} A + \cot A$

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

Asked 2x · 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  $\tan/(1-\cot) + \cot/(1-\tan) = 1 + \sec \operatorname{cosec}$** 

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

Prove that :  $\tan \theta / (1 - \cot \theta) + \cot \theta / (1 - \tan \theta) = 1 + \sec \theta \operatorname{cosec} \theta$

**Some Applications of Trigonometry**

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

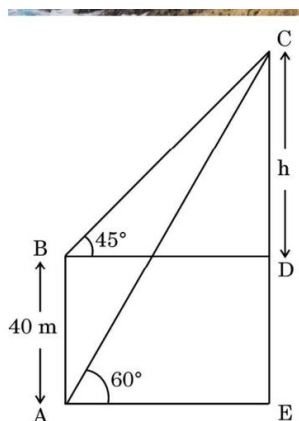
Asked 3x · Board 2026, Sample 2025, Sample 2026 · 1/2/5 marks

[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 3x · 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 2x · 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 2x · Board 2022, Board 2023 · 3/5 marks

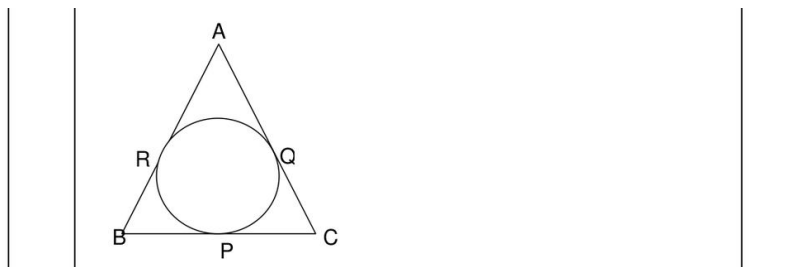
The angle of elevation of the top of a tower 24 m high from the foot of another tower in the same plane is 60 degrees. The angle of elevation of the top of second tower from the foot of the first tower is 30 degrees. Find the distance between two towers and the height of the other tower. Also, find the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

**Circles**

**37. Prove equal tangents theorem**

Asked 2x · 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 2x · 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.                                                | <p>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 <math>\angle AOB = 90^\circ</math></p> <p>For Visually Impaired candidates:</p> | <p>3</p> |

**39. Tangent-chord angle vs central angle MCQ**

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

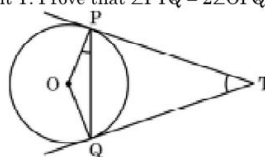
In the given figure, a tangent has been drawn at a point P on the circle centred at O. If angle TPQ = 110 deg then angle POQ is equal to A) 110 deg B) 70 deg C) 140 deg D) 55 deg

**40. Prove angle PTQ = 2 angle OPQ**

Asked 2x · 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  $\angle PTQ = 2\angle OPQ$ .



**41. Tangents at ends of a diameter are parallel**

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

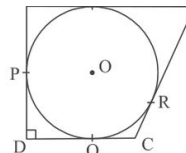
The tangents drawn at the extremities of the diameter of a circle are always : (A) parallel (B) perpendicular (C) equal (D) intersecting

**42. Incircle in quadrilateral with one right angle**

Asked 2x · 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.

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

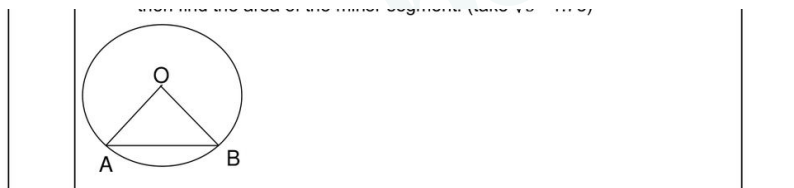


31. The difference between the outer and inner radii of a hollow right circular cylinder of length 14 cm is 1 cm. If the volume of the metal used in making the cylinder is  $176 \text{ cm}^3$  find the outer and inner radii

**Areas Related to Circles****43. Segment area = sector minus triangle**

Asked 5x · 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  $AOB = 60^\circ$ . 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 2x · 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 2x · 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 2x · 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 2x · 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 2x · 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  $1408/21 \text{ m}^3$  of air, find the height of the cylindrical part. (Use  $\pi = 22/7$ ).

**Statistics****49. Missing frequency from one measure, then compute another**

Asked 2x · 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 2x · 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 2x · 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 2x · 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 2x · 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 2x · 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 2x · 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 2x · 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 4x · 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 3x · 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)  $\frac{1}{6}$  B)  $\frac{3}{8}$  C)  $\frac{11}{24}$  D)  $\frac{5}{8}$

**59. Red face card from full deck**

Asked 2x · 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)  $\frac{3}{13}$  (B)  $\frac{2}{13}$  (C)  $\frac{1}{2}$  (D)  $\frac{3}{26}$

**60. Number with a property from 1..N**

Asked 2x · 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)  $\frac{15}{25}$  (B)  $\frac{10}{25}$  (C)  $\frac{11}{25}$  (D)  $\frac{9}{25}$

**61. Complement rule  $p + q = 1$** 

Asked 2x · 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