ICSE · CLASS 10 · MATHEMATICS

ICSE Class 10 Mathematics Important Questions 2027

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

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Goods and Services Tax (GST)

1. find the SGST amount on a discounted marked price

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

An article which is marked at `1,200 is available at a discount of 20% and the rate of GST is 18%. The amount of SGST is: (a) `216.00 (b) `172.80 (c) `108.00 (d) `86.40

2. find the total amount payable for a multi-item bill with GST and discounts

Asked 2× · Sample 2025, Sample 2026 · 4 marks

The following bill shows the GST rate and the marked price of articles: Rajdhani Departmental Store: (a) Dry fruits (1 kg) marked price `1200 discount `100 rate of GST 12%; (b) Packed Wheat flour (5kg) marked price `286 discount Nil rate of GST 5%; (c) Bakery products marked price `500 discount 10% rate of GST 12%. Find the total amount to be paid (including GST) for the above bill.

3. find the total amount payable for a multi-item bill with GST

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

The following bill shows the GST rate and the marked price of articles: Vidhyut Electronics: (a) LED TV set marked price `12000 quantity 01 rate of GST 28%; (b) MP4 player marked price `5000 quantity 01 rate of GST 18%. Find the total amount to be paid (including GST) for the above bill.

Banking - Recurring Deposit Accounts

4. recurring deposit: find the qualifying sum used for interest

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

Radha deposited `400 per month in a recurring deposit account for 18 months. The qualifying sum of money for the calculation of interest is: (a) `3,600 (b) `7,200 (c) `68,400 (d) `1,36,800

5. recurring deposit: find the rate of interest from the maturity value

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

Mr. Sam has a recurring deposit account and deposits `600 per month for 2 years. If he gets `15,600 at the time of maturity, find the rate of interest earned by him.

Shares and Dividends

6. find dividend received and shares bought on reinvesting the proceeds

Asked 2× · Sample 2026, Sample 2027 · 3 marks

Ms. Kaur invested `8000 in buying `100 shares of a company paying 6% dividend at `80. After a year, she sold these shares at `75 each and invested the proceeds including the dividend received during the first year in buying `20 shares paying 15% dividend at `27 each. Find the: (a) dividend received by her during the first year. (b) number of shares she purchased using the total proceeds including the dividend.

7. find the amount required to buy shares at a given market value

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

The sum of money required to buy 50, `40 shares at `38.50 is: (a) `1,920 (b) `1,924 (c) `1,925 (d) `1,952

Linear Inequations

8. solve a combined linear inequation and represent the solution on the number line

Asked 9× · Board 2023, Board 2024, Board 2025, Board 2026, Sample 2023, Sample 2024, Sample 2025, Sample 2026, Sample 2027 · 3 marks

Solve the following inequation, write the solution set and represent it on the real number line. -6 + 12x/5 <= 7x/5 - 3 < 2/5 + 2x, x in R.

9. solve a linear inequation and list the solution set over a restricted domain

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

Given, x + 2 <= x/3 + 3 and x is a prime number. The solution set for x is: (a) empty set (b) {0} (c) {1} (d) {0, 1}

10. solve a linear inequation and give the solution set over a given number domain

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

The solution set for the inequation 2x + 4 <= 14, x in W is: (a) {1, 2, 3, 4, 5} (b) {0, 1, 2, 3, 4, 5} (c) {1, 2, 3, 4} (d) {0, 1, 2, 3, 4}

Quadratic Equations

11. solve the quadratic equation and give roots to given significant figures

Asked 4× · Board 2024, Board 2025, Board 2026, Sample 2027 · 3/4 marks

Solve the quadratic equation $(x - 2)^2 + 11x - 7 = 0$ and give your answer correct to 3 significant figures.

12. find the roots of a simple quadratic equation

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

The roots of quadratic equation $x^2 - 1 = 0$ are: (a) 0, 0 (b) 1, 1 (c) -1, -1 (d) +1, -1

13. use the equal-roots condition to prove a relation between coefficients

Asked 2× · Sample 2025, Sample 2026 · 4 marks

The roots of equation $(q - r)x^2 + (r - p)x + (p - q) = 0$ are equal. Prove that: $2q = p + r$, that is, p, q and r are in A.P.

14. solve the quadratic equation and give roots to given decimal places

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

Solve the given equation $x^2 - 4x - 2 = 0$ and express your answer correct to two places of decimal. (You may use mathematical tables for this question).

15. determine the nature of roots of a quadratic using the discriminant

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

The nature of roots of quadratic equation $3x^2 - 6x - 3 = 0$ are: (a) real and equal (b) real, distinct and rational (c) real, distinct and irrational (d) no real roots

16. quadratic word problem on speed, distance and time

Asked 2× · Board 2023, Board 2025 · 3/4 marks

Mr. and Mrs. Das were travelling by car from Delhi to Kasauli for a holiday. Distance between Delhi and Kasauli is approximately 350 km (via NH 152D). Due to heavy rain they had to slow down. The average speed of the car was reduced by 20 km/hr and time of the journey increased by 2 hours. Find: (a) the original speed of the car. (b) with the reduced speed, the number of hours they took to reach their destination.

Ratio and Proportion

17. find unknowns keeping quantities in a fixed ratio

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

A mixture of paint is prepared by mixing 2 parts of red pigments with 5 parts of the base. Using the given information in the following table, find the values of a, b and c to get the required mixture of paint. Parts of red pigment: 2, 4, b, 6; Parts of base: 5, a, 12.5, c. (a) a=10, b=10, c=10 (b) a=5, b=2, c=5 (c) a=10, b=5, c=10 (d) a=10, b=5, c=15

18. prove a relation using continued proportion

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

If x, y and z are in continued proportion, prove that: $x/(y^2 z^2) + y/(z^2 x^2) + z/(x^2 y^2) = 1/x^3 + 1/y^3 + 1/z^3$

19. solve for the unknown using componendo and dividendo

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

Using componendo and dividend, find the value of x, when: $(x^3 + 3x)/(3x^2 + 1) = 14/13$

20. solve for the unknown using properties of proportion

Asked 2× · Board 2025, Sample 2027 · 3/4 marks

Given, $(a + 2b + x)/(a - 2b + x) = (a + b)^2/(a - b)^2$, a != 0. Using properties of proportion, find the value of x.

21. find unknowns in a table of directly proportional quantities

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

The given table shows the distance covered and the time taken by a train moving at a uniform speed along a straight track. Distance (in m): 60, 90, y; Time (in sec): 2, x, 5. The values of x and y are: (a) x=4, y=150 (b) x=3, y=100 (c) x=4, y=100 (d) x=3, y=150

Factorisation (Remainder and Factor Theorem)

22. find the remaining factor of a cubic given some of its factors

Asked 2× · Sample 2026, Sample 2027 · 1 marks

(x + 2) and (x + 3) are the factors of $x^3 + 4x^2 + x - 6$. The third factor of the given polynomial is: (a) (x - 1) (b) (x - 4) (c) (x + 1) (d) (x + 4)

23. factorise a cubic completely using the remainder/factor theorem

Asked 2× · Sample 2024, Sample 2027 · 3 marks

Using Remainder and Factor Theorem, factorise the following polynomial: $2x^3 + 5x^2 - 28x - 15$.

24. verify whether a linear expression is a factor and factorise the cubic completely

Asked 2× · Sample 2025, Sample 2026 · 4 marks

While factorizing a given polynomial, using remainder and factor theorem, a student finds that (2x + 1) is a factor of $2x^3 + 7x^2 + 2x - 3$. (a) Is the student's solution correct stating that (2x + 1) is a factor of the given polynomial? (b) Give a valid reason for your answer. Also, factorize the given polynomial completely.

25. use the factor theorem to find an unknown and factorise the cubic completely

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

It is given that (x - 2) is a factor of polynomial $2x^3 - 7x^2 + kx - 2$. Find: (a) the value of k. (b) hence, factorise the resulting polynomial completely.

Matrices

26. compute the product of two matrices

Asked 2× · Sample 2026, Sample 2027 · 1 marks

Given two matrices A and B, where A = [-1 2] and B = [[3],[4]] then product AB is: (a) [[-3],[8]] (b) 5 (c) [5] (d) [-3 8]

27. prove a matrix satisfies a given matrix equation

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

Given matrix, X = [[1,1],[8,3]] and I = [[1,0],[0,1]], prove that $X^2 = 4X + 5I$.

Arithmetic and Geometric Progression

28. AP: find the common difference from a relation between partial sums

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

An Arithmetic Progression (A.P.) has 3 as its first term. The sum of the first 8 terms is twice the sum of the first 5 terms. Find the common difference of the A.P.

29. AP: find first term, common difference and sum from two given terms

Asked 2× · Board 2023, Board 2026 · 3/4 marks

The fourth and seventh terms of an Arithmetic Progression (A.P.), are 60 and 114 respectively. Find the: (a) first term and common difference. (b) sum of its first 10 terms.

Reflection and Section Formula

30. reflect given points in the axes/origin and name the closed figure formed

Asked 2× · Board 2023, Board 2025 · 5 marks

Use a graph paper for this question taking 2 cm = 1 unit along both axes. (a) Plot A(1, 3), B(1, 2) and C(3, 0). (b) Reflect A and B on the x-axis and name their images as E and D respectively. Write down their coordinates. (c) Reflect A and B through the origin and name their images as F and G respectively. (d) Reflect A, B and C on the y-axis and name their images as J, I and H respectively. (e) Join all the points A, B, C, D, E, F, G, H, I and J in order and name the closed figure so formed.

Equation of a Straight Line

31. identify the line whose slope makes equal angles with the axes

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

Which of the following equations represents a line equally inclined to the axes? (a) 2x - 3y + 7 = 0 (b) x - y = 7 (c) x = 7 (d) y = -7

32. find the centroid and the equation of a line through it parallel to a side

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

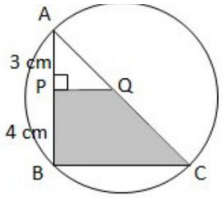
Find the coordinates of the centroid P of the triangle ABC, whose vertices are A(-1, 3), B(3, -1) and C(0, 0). Hence, find the equation of a line passing through P and parallel to AB.

Similarity

33. find an area using the ratio of areas of similar triangles

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

In the figure given below, AC is a diameter of the circle. AP = 3 cm and PB = 4 cm and QP perpendicular to AB. If the area of triangle APQ is 18 cm^2, then the area of shaded portion QPBC is: (a) 32 cm^2 (b) 49 cm^2 (c) 80 cm^2 (d) 98 cm^2

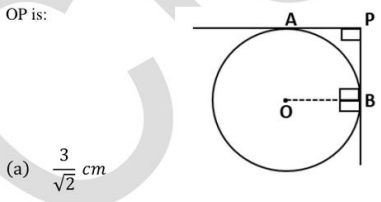


Circles

34. circle: find the distance to an external point using perpendicular tangents

Asked 2× · Sample 2026, Sample 2027 · 1 marks

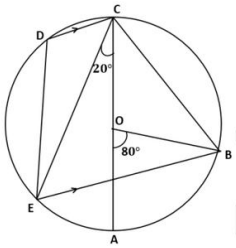
In the given diagram, the radius of the circle with centre O is 3 cm. PA and PB are the tangents to the circle which are at right angle to each other. The length of OP is: (a) 3/sqrt(2) cm (b) 3 cm (c) 3sqrt(2) cm (d) 6sqrt(2) cm



35. circle: find several angles using centre-angle and parallel-chord properties

Asked 2× · Sample 2025, Sample 2026 · 4 marks

In the given figure, AC is the diameter of the circle with centre O. CD is parallel to BE. angle AOB = 80 and angle ACE = 20. Calculate: (a) angle BEC (b) angle BCD (c) angle CED

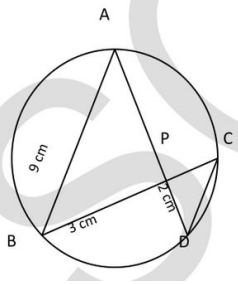


[Analysis & Evaluation]

36. circle: prove similarity of triangles from intersecting chords and find length and area ratio

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

In the given figure (not drawn to scale) chords AD and BC intersect at P, where AB = 9 cm, PB = 3 cm and PD = 2 cm. (a) Prove that triangle APB ~ triangle CPD. (b) Find the length of CD. (c) Find area triangle APB : area triangle CPD.



37. circle: find several angles using tangent and centre-angle theorems

Asked 2× · Board 2024, Board 2025 · 4 marks

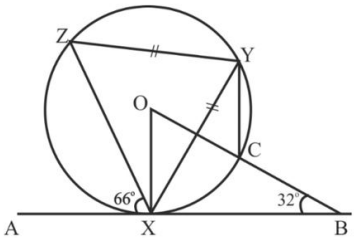
X, Y, Z and C are the points on the circumference of a circle with centre O. AB is a tangent to the circle at X and ZY = XY. Given angle OBX = 32 and angle AXZ = 66. Find: (a) angle BOX (b) angle CYX (c) angle ZYX (d) angle OXY

(a) ∠BOX

(b) ∠CYX

(c) ∠ZYX

(d) ∠OXY



Constructions

38. construct a triangle and circumscribe a circle, measure its radius

Asked 2× · Board 2023, Board 2025 · 4 marks

Use ruler and compass for the following construction. Construct a triangle ABC, where AB = 6 cm, AC = 4.5 cm and angle BAC = 120. Construct a circle circumscribing the triangle ABC. Measure and write down the length of the radius of the circle.

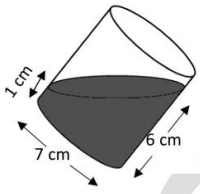
Mensuration - Cylinder, Cone and Sphere

39. find the wet surface area of a cylinder from the liquid height

Asked 2× · Sample 2025, Sample 2026 · 4 marks

In the diagram given below, a tilted right circular cylindrical vessel with base diameter 7 cm contains a liquid. When placed vertically, the height of the liquid in the vessel is the mean of two heights shown in the diagram (7 cm and 6 cm). Find the area of wet surface, when the cylinder is placed vertically on a horizontal surface. (Use pi = 22/7).

(Use $\pi = \frac{22}{7}$).



[Application & Evaluation]

40. find the number of spheres fitting a volume and the total mass

Asked 2× · Sample 2025, Sample 2026 · 4 marks

A manufacturing company prepares spherical ball bearings, each of radius 7 mm and mass 4 gm. These ball bearings are packed into boxes. Each box can have a maximum of 2156 cm^3 of ball bearings. Find the: (a) maximum number of ball bearings that each box can have. (b) mass of each box of ball bearings in kg. (Use pi = 22/7)

Trigonometric Identities

41. prove the given trigonometric identity

Asked 9× · Board 2023, Board 2025, Board 2026, Sample 2023, Sample 2024, Sample 2025, Sample 2026, Sample 2027 · 3/4 marks

Prove the following trigonometric identity: ($\cos^2$ theta)/(1 - tan theta) + ($\sin^2$ theta)/(1 - cot theta) = 1 + cos theta sin theta

42. assertion-reason on a product simplified by a fundamental identity

Asked 2× · Sample 2026, Sample 2027 · 1 marks

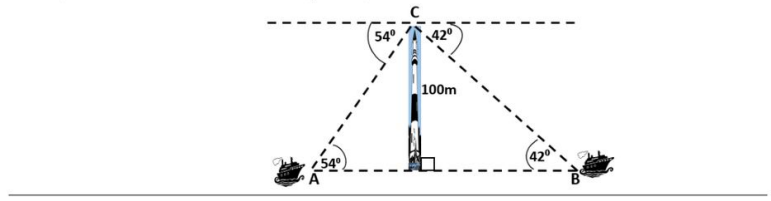
Assertion (A): If sec theta + tan theta = a and sec theta - tan theta = b, then ab = 1. Reason (R): $\sec^2$ theta - $\tan^2$ theta = 1. (a) A is true and R is false. (b) A is false and R is true. (c) Both A and R are true, and R is the correct explanation for A. (d) Both A and R are true, but R is not the correct explanation for A.

Heights and Distances

43. heights and distances: find distance between two objects using two right triangles

Asked 4× · Board 2023, Sample 2024, Sample 2026, Sample 2027 · 4/5 marks

The angle of depression of two ships A and B on opposite sides of a light house of height 100 m are respectively 42 and 54. The line joining the two ships passes through the foot of the lighthouse. (a) Find the distance between the two ships A and B. (b) Give your final answer correct to the nearest whole number. (Use mathematical tables for this question)



Statistics - Mean, Median, Mode and Ogive

44. find the mean of grouped data by the step-deviation method

Asked 6× · Board 2024, Board 2026, Sample 2023, Sample 2024, Sample 2025, Sample 2026 · 3/4 marks

Find the mean of the following frequency distribution using step-deviation method. Take assumed mean = 28. Class Interval: 0-8 (10), 8-16 (20), 16-24 (14), 24-32 (16), 32-40 (18), 40-48 (22).

45. draw an ogive and read off median and counts above/below given marks

Asked 3× · Sample 2025, Sample 2026, Sample 2027 · 5 marks

The distribution given below represents marks obtained by 200 students in a Mathematics Examination with maximum marks 80. Marks: 0-10 (8), 10-20 (12), 20-30 (16), 30-40 (24), 40-50 (29), 50-60 (38), 60-70 (42), 70-80 (31). Using graph paper draw an ogive for the given distribution. Along one axis take 2 cm equal to 10 marks and along the other axis take 1 cm equal to 10 students. Use your graph to find: (a) Median (b) Number of students who scored above 75 marks (c) If the pass percentage is 35%, find the number of students who scored 35% and below.

46. draw a histogram and find the mode of a grouped distribution

Asked 4× · Board 2023, Board 2025, Sample 2024, Sample 2027 · 3/4 marks

The table given below shows a record of the weight in kilogram of 100 students of a school. Weight (kg): 30-35 (5), 35-40 (7), 40-45 (14), 45-50 (21), 50-55 (25), 55-60 (15), 60-65 (7), 65-70 (6). Draw a histogram and find the modal weight. [Take 2 cm = 5 kg along one axis and 2 cm = 5 students along the other axis]

47. find the mean from the sum of the observations and their count

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

Given that the sum of the squares of the first seven natural numbers is 140, then their mean is: (a) 20 (b) 70 (c) 280 (d) 980

48. draw a histogram and estimate the mode of a grouped distribution

Asked 2× · Sample 2023, Sample 2025 · 3/4 marks

The table given below shows the runs scored by a cricket team during the overs of a match. Overs: 20-30 (37), 30-40 (45), 40-50 (40), 50-60 (60), 60-70 (51), 70-80 (35). Use graph sheet for this question. Take 2 cm = 10 overs along one axis and 2 cm = 10 runs along the other axis. (a) Draw a histogram representing the above distribution. (b) Estimate the modal runs scored.

Probability

49. find the probability of an impossible event

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

A bag contains 3 red and 2 blue marbles. A marble is drawn at random. The probability of drawing a black marble is: (a) 0 (b) 1/5 (c) 2/5 (d) 3/5

50. probability of single events using lettered cards

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

The following letters A, D, M, N, O, S, U, Y of the English alphabet are written on separate cards and put in a box. The cards are well shuffled and one card is drawn at random. What is the probability that the card drawn is a letter of the word, (a) MONDAY? (b) which does not appear in MONDAY? (c) which appears both in SUNDAY and MONDAY?

51. probability of single events on numbered cards

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

Ms. Sushmita went to a fair and participated in a game. The game consisted of a box having number cards with numbers from 01 to 30. The three prizes were as per the given table: Wall Clock - perfect square; Water Bottle - even number which is also a multiple of 3; Purse - prime number. Find the probability of winning a: (a) Wall Clock (b) Water Bottle (c) Purse