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MOST IMPORTANT QUESTIONS

CBSE

Class X Maths

Most Important Questions (2018)

Chapter 1: Real Numbers

1. Prove that $4 - \sqrt{3}$ is an irrational number. [3]
2. What can you say about the prime factorisation of the denominator of $27.\overline{142857}$ [2]
3. The decimal expansion of the rational number $\frac{43}{2^4 \times 5^3}$ will terminate after how many places of decimals? [3]
4. Find the HCF of 105 and 120. [3]
5. Write whether $\frac{2\sqrt{45}+3\sqrt{20}}{2\sqrt{5}}$ on simplification gives a rational or an irrational number. [2]

Chapter 2: Polynomials

1. Find all the zeros of the polynomial $2x^3 + x^2 - 6x - 3$, if two of its zeros are $-\sqrt{3}$ and $\sqrt{3}$. [3]
2. If $(x + a)$ is a factor of $2x^2 + 2ax + 5x + 10$, find a. [2]
3. For what value of k, is 3 a zero of the polynomial $2x^2 + x + k$? [2]
4. Given that $x - \sqrt{5}$ is a factor of the cubic polynomial $x^3 - 3\sqrt{5}x^2 + 13x - 3\sqrt{5}$, find all the zeros of the polynomial. [4]
5. If α, β are the zeros of the polynomial $2y^2 + 7y + 5$, write the value of $\alpha + \beta + \alpha\beta$. [3]

Chapter 3: Pair of Linear Equations in Two Variables

1. Solve graphically the following system of linear equations. Also find the coordinates of the points where the lines meet axis of y. [4]

   $2x + y - 11 = 0$,

   $x - y - 1 = 0$

2. Draw the graphs of $x - y + 1 = 0$ and $3x + 2y - 12 = 0$. Determine the coordinates of the vertices of the triangle formed by these lines and x-axis and shade the triangular area. Calculate the area bounded by these lines and x-axis. [4]

3. Solve the following: [3]

   $\frac{4}{x} + 3y = 8$

   $\frac{6}{x} - 4y = -5$

4. Solve the following system of equations by the method of cross-multiplication: [3]

   $2(ax - by) + a + 4b = 0$

   $2(bx + ay) + b - 4a = 0$

5. Find the value of k for which the following system of equations have infinitely many solutions: [3]

   $2x + 3y = k$

   $(k - 1)x + (k + 2)y = 3k$

6. A two-digit number is such that the product of its digits is 20. If 9 is added to the number, the digits interchange their places. Find the number. [3]

7. Places A and B are 100 km apart on a highway. One car starts from A and another from B at the same time. If the cars travel in the same direction at different speeds, they meet in 5 hours. If they travel towards each other, they meet in 1 hours. What are the speeds of two cars? [3]

Chapter 4: Quadratic Equations

1. Solve the following quadratic equation for x: $4\sqrt{3}x^2 + 5x - 2\sqrt{3} = 0$ [2M]
2. If -5 is a root of the quadratic equation $2x^2 + px - 15 = 0$ and the quadratic equation $p(x^2 + x)k = 0$ has equal roots, find the value of k. [2M]
3. Solve for x: $\frac{1}{(x-1)(x-2)} + \frac{1}{(x-2)(x-3)} = \frac{2}{3}$, $x \neq 1, 2, 3$ [3M]
4. For what values of k, the roots of the quadratic equation: [3M]

   $(k + 4)x^2 + (k + 1)x + 1 = 0$ are equal?
5. A shopkeeper buys some books for Rs. 80. If he had bought 4 more books for the same amount, each book would have cost Rs. 1 less. Find the number of books he bought. [4M]
6. A train travels at a certain average speed for a distance of 54 km and then travels a distance of 63 km at an average speed of 6 km/h more than the first speed. If it takes 3 hours to complete the total journey, what is its first speed? [4M]

Chapter 5: Arithmetic Progressions

1. Find the number of natural numbers between 101 and 999 which are divisible by both 2 and 5. [2M]
2. In an A.P., if $S_6 + S_7 = 167$ and $S_{10} = 235$, then find the A.P., where S_n denotes the sum of its first n terms. [2M]
3. If the ratio of the sum of first n terms of two A.P's is (7n + 1): (4n + 27), find the ratio of their m^{th} terms. [3M]
4. The 14^{th} term of an A.P. is twice its 8^{th} term. If its 6^{th} term is -8, then find the sum of its first 20 terms. [3M]
5. The houses in a row numbered consecutively from 1 to 49. Show that there exists a value of X such that sum of numbers of houses preceding the house numbered X is equal to sum of the numbers of houses following X. [4M]
6. Find the number of terms of the AP -12, -9, -6,... 12. If 1 is added to each term of this AP, then find the sum of all terms of the AP thus obtained. [4M]

Chapter 6: Triangles

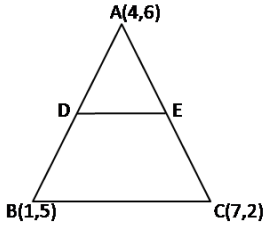
1. In ΔABC, D and E are points on the sides AB and AC respectively such that DE is parallel to BC. If AD = 2.5 cm, BD = 3.0 cm and AE = 3.75 cm, find the length of AC. [2M]
2. In Δ ABC, AD is the bisector of ∠, meeting side BC at D. If AB = 10 cm, AC = 6 cm and BC = 12 cm, find BD and DC. [2M]
3. If D is a point on the side AB of ΔABC such that AD : DB = 3 : 2 and E is a point on BC such that DE ∥ AC. Find the ratio of areas of ΔABC and ΔBDE. [3M]
4. Determine whether the triangle having sides (a – 1) cm, $2\sqrt{a}$ cm and (a + 1) cm is a right angled triangle. [3M]
5. In right-angled ΔABC in which ∠C = 90°, if D is the mid-point of BC, prove that

   $AB^2 = 4AD^2 - 3AC^2$. [3M]
6. The lengths of the diagonals of a rhombus are 30 cm and 40 cm. Find the side of the rhombus. [3M]

Chapter 7: Coordinate Geometry

1. If a point A(0, 2) is equidistant from the points B(3, p) and C(p, 5), find the value of p. [2M]
2. Let P and Q be the points of trisection of the line segment joining the points A(2, -2) and B(-7, 4) such that P is nearer to A. Find the coordinates of P and Q. [2M]
3. Show that the points (-2, 3), (8, 3) and (6, 7) are the vertices of a right triangle. [3M]
4. Find the ratio in which the line segment joining the points A(3, -3) and B(-2, 7) is divided by x-axis. Also find the coordinates of the point of division. [3M]
5. In figure, the vertices of ΔABC are A(4, 6), B(1, 5) and C(7, 2). A line-segment DE is drawn to intersect the sides AB and AC at D and E respectively such that $\frac{AD}{AB} = \frac{AE}{AC} = \frac{1}{3}$. [4M]

   Calculate the area of ΔADE and compare it with area of ΔABC.



6. If the area of triangle ABC formed by A(x, y), B(1, 2) and C(2, 1) is 6 square units, then prove that x + y = 15. [4M]

Chapter 8: Trigonometry

1. In ΔABC, right-angled at A, if tan C = $\sqrt{3}$, find the value of sin B cos C + cos B sin C. [2M]

2. Prove that $\left(\sqrt{3}+1\right)\left(3-\cot 30^\circ\right)=\tan^3 60^\circ-2\sin 60^\circ$. [3M]

3. Evaluate $\frac{\cos 58^\circ}{\sin 32^\circ}+\frac{\sin 22^\circ}{\cos 68^\circ}-\frac{\cos 38^\circ \operatorname{cosec} 52^\circ}{\tan 18^\circ \tan 35^\circ \tan 60^\circ \tan 72^\circ \tan 55^\circ}$. [3M]

4. If sec 2A = cosec (A – 42°), where 2A is an acute angle, find the value of A. [2M]

5. Prove: $2\sec^2\theta-\sec^4\theta-2\operatorname{cosec}^2\theta+\operatorname{cosec}^4\theta=\cot^4\theta-\tan^4\theta$ [3M]

6. Prove $\left(1+\tan^2 A\right)+\left(1+\frac{1}{\tan^2 A}\right)=\frac{1}{\sin^2 A-\sin^4 A}$ [3M]

7. If $\operatorname{cosec}\theta=\frac{13}{12}$, find the value of $\frac{2\sin\theta-3\cos\theta}{4\sin\theta-9\cos\theta}$. [3M]

8. If $5x=\sec\theta$ and $\frac{5}{x}=\tan\theta$, find the value of $5\left(x^2-\frac{1}{x^2}\right)$. [3M]

Chapter 9: Some Applications of Trigonometry

1. The angle of elevation of an aero plane from point A on the ground is 60°. After flight of 15 seconds, the angle of elevation changes to 30°. If the aeroplane is flying at a constant height of $1500\sqrt{3}$ m, find the speed of the plane in km/hr. [3M]

2. The horizontal distance between two poles is 15 m. The angle of depression of the top of first pole as seen from the top of second pole is 30°. If the height of the second pole is 24 m, find the height of the first pole. [Use $\sqrt{3}$ = 1.732] [3M]

3. A kite is flying at a height of 45 m above the ground. The string attached to the kite is temporarily tied to a point on the ground. The inclination of the string with the ground is 60°. Find the length of the string assuming that there is slack in the string. [3M]

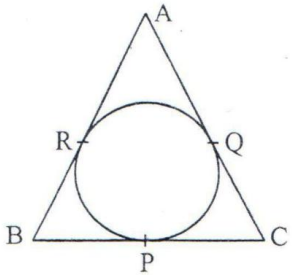
4. The angle of elevation of the top of a tower at a distance of 120 m from a point A on the ground is 45°. If the angle of elevation of the top of a flagstaff fixed at the top of the tower, at A is 60°, then find the height of the flagstaff. $\left[\text{Use}\sqrt{3}=1.73\right]$ [4M]

5. At a point A, 20 metres above the level of water in a lake, the angle of elevation of a cloud is 30°. The angle of depression of the reflection of the cloud in the lake, at A is 60°. Find the distance of the cloud from A. [4M]

6. Two poles of equal heights are standing opposite each other on either side of the roads, which is 80 m wide. From a point between them on the road, the angles of elevation of the top of the poles are 60^o and 30^o respectively. Find the height of the poles and the distances of the point from the poles. [4M]

Chapter 10: Circle

1. In fig., an isosceles triangle ABC, with AB = AC, circumscribes a circle. Prove that the point of contact P bisects the base BC. [2M]



2. Prove that a parallelogram circumscribing a circle is a rhombus. [2M]

3. In Fig. 2, a quadrilateral ABCD is drawn to circumscribe a circle, with centre O, in such a way that the sides AB, BC, CD and DA touch the circle at the points P, Q, R and S respectively. Prove that AB + CD = BC + DA. [2M]

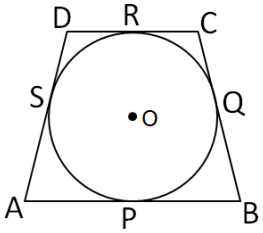
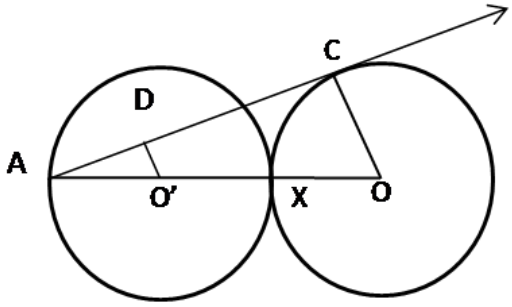


Figure 2

4. Prove that the lengths of the tangents drawn from an external point to a circle are equal.[4M]

5. Prove that opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle. [4M]

6. In figure, two equal circles, with centres O and O', touch each other at X. OO' produced meets the circle with centre O' at A. AC is tangent to the circle with centre O, at the point C. O'D is perpendicular to AC. Find the value of $\frac{DO'}{CO}$. [4M]



Chapter 11: Construction

1. Draw a line segment AB of length 8 cm. Taking A as centre, draw a circle of radius 4 cm and taking B as centre, draw another circle of radius 3 cm. Construct tangents to each circle from the centre of the other circle. [3M]

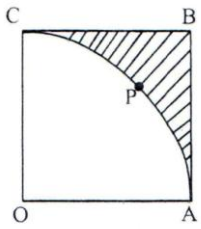
2. Construct a tangent of a circle of radius 4 cm from a point on the concentric circle of radius 6 cm. [3M]

3. Draw a circle of radius 4 cm. Draw two tangents to the circle inclined at an angle of 60° to each other. [4M]

4. Construct a Δ ABC in which AB = 6 cm, ∠A = 30° and ∠B = 60°, Construct another ΔAB'C' similar to ΔABC with base AB' = 8 cm. [4M]

Chapter 12: Areas Related to Circles

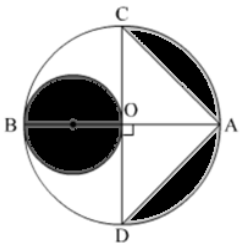
1. In fig., OABC is a square of side 7 cm. If OAPC is a quadrant of a circle with centre O, then find the area of the shaded region. $\left[\text{Use } \pi = \frac{22}{7}\right]$ [2M]



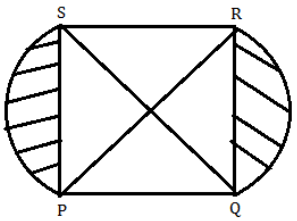
2. Two circular pieces of equal radii and maximum area, touching each other are cut out from a rectangular card board of dimensions 14 cm $\times$ 7 cm. Find the area of the remaining card board. $\left[\text{Use } \pi = \frac{22}{7}\right]$ [2M]

3. Find the area of the minor segment of a circle of radius 14 cm, when its central angle is 60°. Also find the area of the corresponding major segment. $\left[\text{Use } \pi = \frac{22}{7}\right]$ [3M]

4. In Fig., AB and CD are two diameters of a circle with centre O, which are perpendicular to each other. OB is the diameter of the smaller circle. If OA = 7 cm, find the area of the shaded region. $\left[\text{Use } \pi = \frac{22}{7}\right]$ [3M]



5. In Figure 5, PQRS is square lawn with side PQ = 42 metres. Two circular flower beds are there on the sides PS and QR with centre at O, the intersections of its diagonals. Find the total area of the two flower beds (shaded parts). [4M]



6. Sum of the areas of two squares is 400 cm^2. If the difference of their perimeters is 16 cm, find the sides of the two squares. [4M]

Chapter 13: Surface Area and Volume

1. If the total surface area of a solid hemisphere is 462 cm^2, find its volume. $\left[\text{Take } \pi = \frac{22}{7}\right]$

[2M]

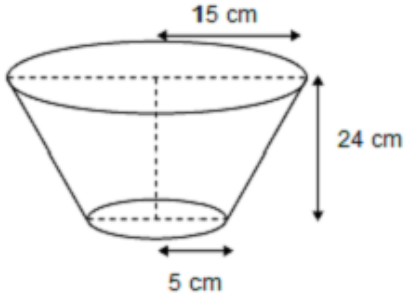
2. The volume of a hemisphere is $2425\frac{1}{2}$ cm^3. Find its curved surface area. $\left[\text{Use } \pi = \frac{22}{7}\right]$

[2M]

3. Due to sudden floods, some welfare associations jointly requested the government to get 100 tents fixed immediately and offered to contribute 50% of the cost. If the lower part of each tent is of the form of a cylinder of diameter 4.2 m and height 4 m with the conical upper part of same diameter but height 2.8 m, and the canvas to be used costs Rs. 100 per sq. m, find the amount, the associations will have to pay. What values are shown by these associations? [Use $\pi = \frac{22}{7}$] [3M]

4. Water in a canal, 6 m wide and 1.5 m deep, is flowing at a speed of 4 km/h. How much area will it irrigate in 10 minutes, if 8 cm of standing water is needed for irrigation? [3M]

5. A bucket open at the top and made up of a metal sheet is in the form of a frustum of a cone. The depth of the bucket is 24 cm and the diameters of its upper and lower circular ends are 30 cm and 10 cm respectively. Find the cost of metal sheet used in it at the rate of Rs 10 per 100 cm^2. [Use $\pi = 3.14$] [4M]



6. A solid is in the shape of a cone standing on a hemisphere with both their radii being equal to 7 cm and the height of the cone is equal to its diameter. Find the volume of the solid. [Use $\pi = \frac{22}{7}$]. [4M]

Chapter 14: Statistics

1. If the mean of the following data is 18.75, find the value of p. [3M]

x_i :	10	15	p	25	30
f_i :	5	10	7	8	2

2. Find the mean of the following distribution: [4M]

Classes:	25-29	30-34	35-39	40-44	45-49	50-54	55-59
Frequency:	14	22	16	6	5	3	4

3. Find the class marks of classes 10-25 and 35-55. [1M]

4. During the medical check-up of 35 students of a class, their weights were recorded as follows: [4M]

Weight (in kg)	Number of students
Less than 38	0
Less than 40	3
Less than 42	5
Less than 44	9
Less than 46	14
Less than 48	28
Less than 50	32
Less than 52	35

Draw less than type ogive for the given data. Hence, obtain the median weight from the graph and verify the result by using the formula.

Chapter 15: Probability

1. Two different dice are tossed together. Find the probability [2M]

   (i) That the number on each die is even.

   (ii) That the sum of numbers appearing on the two dice is 5.

2. A card is drawn at random from a well shuffled pack of 52 playing cards. Find the probability that the drawn card is neither a king nor a queen. [2M]

3. The probability of selecting a red ball at random from a jar that contains only red, blue and orange balls is $\frac{1}{4}$. The probability of selecting a blue ball at random from the same jar $\frac{1}{3}$. If the jar contains 10 orange balls, find the total number of balls in the jar. [3M]

4. Three different coins are tossed together. Find the probability of getting [3M]

   a. exactly two heads

   b. at least two heads

   c. at least two tails

5. A card is drawn at random from a well-shuffled deck of playing cards. Find the probability that the card drawn is [4M]

   (i) a card of spade or an ace

   (ii) a black king

   (iii) neither a jack nor a king

   (iv) either a king or a queen.

6. A Group consists of 12 persons, of which 3 are extremely patient, other 6 are extremely honest and rest are extremely kind. A person from the group is selected at random. Assuming that each person is equally likely to be selected, find the probability of selecting a person who is (i) extremely patient (ii) extremely kind or honest. Which of the above values you prefer more? [4M]