CBSE QUESTIONS

1 Quadratic Equations

(i) If $x = 3$ is one of the quadratic equation $x^2 - 2kx - 6 = 0$, then find the value of k.

2 Real Numbers

(i) what is the HCF of smallest prime number and the smallest composite number?

(ii) Given that $\sqrt{2}$ is irrational, prove that $\left(5 + 3\sqrt{2}\right)$ is an irrational number.

(iii) Find the sum of 8 multiples of 3.

(iv) Find the HCF and LCM of 404 and 96 and verify that HCF*LCM = product of the given numbers.

3 Coordinate Geometry

(i) Find the distance of a point $\mathbf{P}(x, y)$ from the origin.

(ii) Find the ratio in which $\mathbf{P}(4, m)$ divides the line segment joining the points $\mathbf{A}(2, 3)$ and $\mathbf{B}(6, -3)$. Hence find m.

4 Polynomial

(i) Find all zeroes of the polynomial $\left(2x^4 - 9x^3 + 5x^2 + 3x - 1\right)$ if two of its zeroes are $\left(2 + \sqrt{3}\right)$ and $\left(2 - \sqrt{3}\right)$.

5 Trigonometry

(i) If $4 \tan \theta = 3$, evaluate

$$\left(\frac{4 \sin \theta - \cos \theta + 1}{4 \sin \theta + \cos \theta - 1} \right)$$

(ii) If $\tan 2A = \cot(A - 18°)$, where $2A$ is an acute angle, find the value of A.

(iii) What is the value of $\left(\cos^2 67° - \sin^2 23° \right)$?

(iv) Prove that: $\left(\frac{\sin A - 2sin^3 A}{2 \cos^3 A - \cos A} = \tan A \right)$

6 Geometry

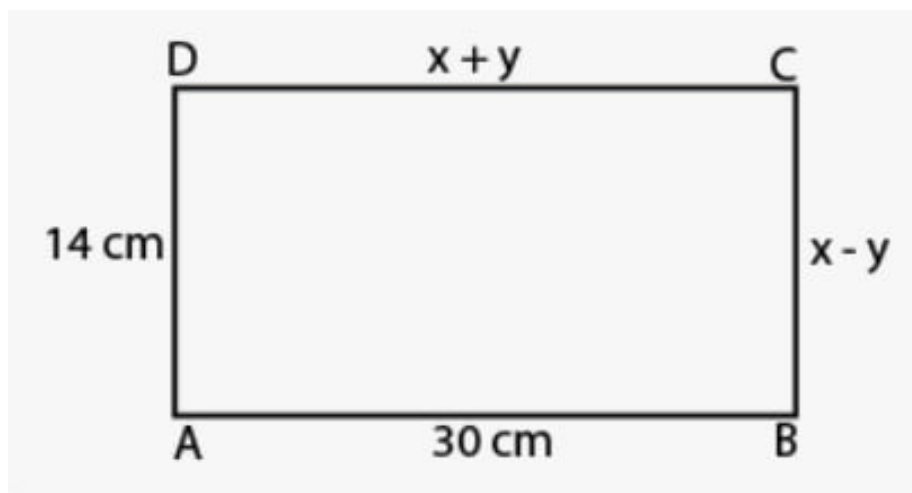(i) $ABCD$ is a rectangle. Find the values of x and y. Figure ??

Figure 1: rect ABCD

(ii) Find the area of the shaded region in Figure ??, where arcs drawn with centres $\mathbf{A}, \mathbf{B}, \mathbf{C}$ and $\mathbf{D}$ intersect in pairs at mid-points $\mathbf{P}, \mathbf{Q}, \mathbf{R}$ and $\mathbf{S}$ of the sides AB, BC, CD and DA respectively of a square ABCD of side 12 cm. (**Use** $\pi = 3.14$)
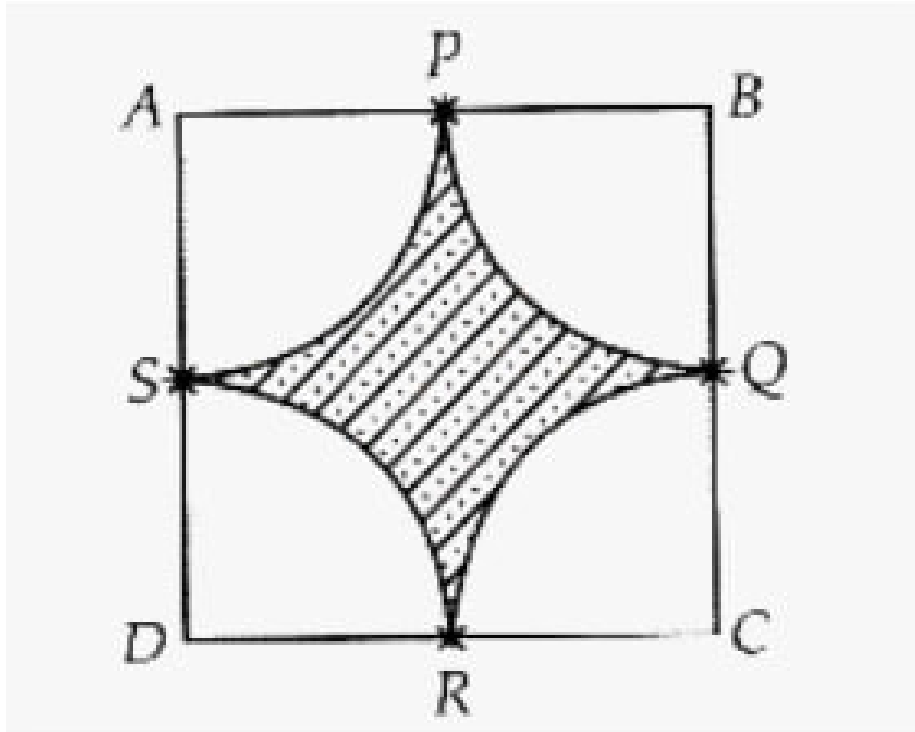
Figure 2: square ABCD

(iii) A wooden article was made by scooping out a hemisphere from each end of a solid cylinder, as shown in Figure **??**. If the height of the cylinder is 10 cm and its base is of radius 3.5 cm. Find the total surface area of the article.
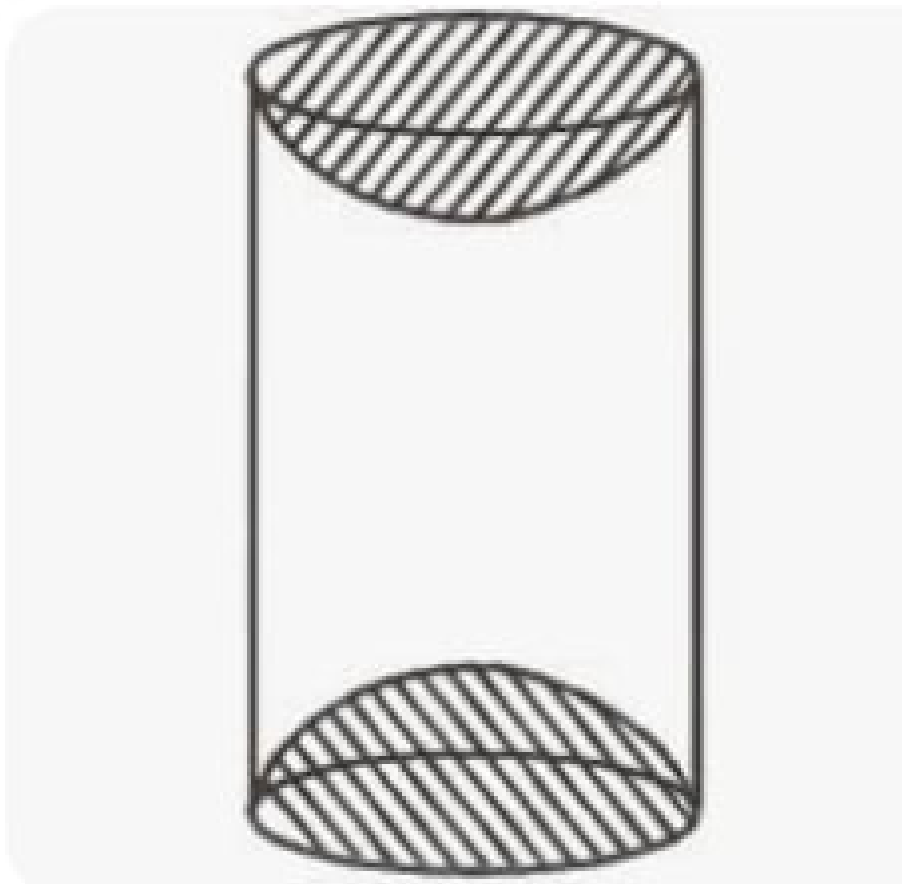
Figure 3: cylinder

(iv) Given $\triangle ABC \cong \triangle PQR$, if $\frac{AB}{PQ} = \frac{1}{3}$, then find $\frac{ar\triangle ABC}{ar\triangle PQR}$.

(v) $\mathbf{A}(-2, 1), \mathbf{B}(a, 0), \mathbf{C}(4, b)$ and $\mathbf{D}(1, 2)$ are the vertices of a parallelogram ABCD, find the values of a and b. Hence find the lengths if its sides.

(vi) $\mathbf{A}(-5, 7), \mathbf{B}(-4, -5), \mathbf{C}(-1, -6)$ and $\mathbf{D}(4, 5)$ are the vertices of a quadrilateral, find the area of the quadrilateral ABCD.

(vii) In an equilateral $\triangle$ ABC, D is a point on side BC such that $BD = \frac{1}{3}BC$. Prove that $9(AD)^2 = 7(AB)^2$.

(viii) Prove that, in a right triangle, the square on the hypotenuse is equal to sum of the squares on the other two sides.

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(ix) Prove that the area of an equilateral triangle described on one side of the square is equal to half of the area of the equilateral triangle described on one of its diagonal.

(x) If the area of two similar triangles are equal, prove that they are congruent.

(xi) Draw a triangle ABC with $BC = 6cm, AB = 5cm$ and $\angle ABC = 60°$. Then construct a triangle whose sides are $\frac{3}{4}$ of the corresponding sides of the $\triangle ABC$.

7 tangents and secants to a circle

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

8 Surface, Areas and Volumes

(i) A heap of rice is in the form of a cone of base diameter 24 and height $3.5m$. Find the volume of the rice. How much canvas cloth is required to just cover the heap?

(ii) A plane left 30 minutes late than its scheduled time and in order to reach the destination 1500 km away in time, it had to increase its speed by $100km/h$ from the usual speed. Find its usual speed.

(iii) A motor boat whose speed is $18km/hr$ in still water takes $1hr$ more to go $24km$ upstream than to return downstream to the same spot. Find the speed of the stream.

(iv) A train travels at a certain average speed for a distance of 63 km and then travels at a distance of 72 km at an average speed of $6km/hr$ more than its original speed. If it takes 3 hours to complete total journey, what is the original average speed?

(v) As observed from the top of a $100m$ high light house from the sea level, the angles of depression of two ships are $30°$ and $45°$. If one ship is exactly behind the other on the same side of the light house, find the distance between the two ships. (**Use** $\sqrt{3} = 1.732$)

(vi) The diameters of the lower and upper ends of a bucket in the form of a frustum of a cone are 10 cm and 30 cm respectively. If its height is 24 cm, find:

  (i) The area of the metal sheet used to make the bucket.

  (ii) Why we should avoid the bucket made by ordinary plastic? (**Use** $\pi = 3.14$)

9 Statistics

(i) The mean of the following distribution is 18. Find the frequency f of the class $19 - 21$.

Class	$11 - 13$	$13 - 15$	$15 - 17$	$17 - 19$	$19 - 21$	$21 - 23$	$23 - 25$
Frequency	3	6	9	13	f	5	4

(ii) The following distribution gives the daily income of 50 workers of a factory:

Daily Income (in ₹)	$100 - 120$	$120 - 140$	$140 - 160$	$160 - 180$	$180 - 200$
Number of workers	12	14	8	6	10

Convert the distribution above to a less than type cumulative frequency distribution and draw its ogive.

(iii) The table below shows the salaries of 280 persons:

Salary(In thousand ₹)	No. of Persons
5-10	49
10-15	133
15-20	63
20-25	15
25-30	6
30-35	7
35-40	4
40-45	2
45-50	1

Calculate the median salary of the data.

10 Arthimetic progressions

(i) In an AP, if the common difference $(d) = -4$, and the seventh term(a_7) is 4, then find the first term.

(ii) The sum of four consecuive numbers in an AP is 32 and the ratio of the product of the first and the last term to the product of two middle term is $7 : 15$. Find the numbers.

11 Probability

(i) Two different dice are tossed together. Find the probability:

    (i) of getting a doublet

(ii) of getting a sum 10, of the numbers on the two dice.

(ii) An integer is choosen at random between 1 and 100. Find the probability that it is:

    (i) divisible by 8.

    (ii) not divisible by 8.