Kendriya Vidyalaya Sangathan

ZIET Mysore

Class X Maths

HOTS Questions

Chapter 1. Real Numbers

1. Given that H C F (2530, 4400) =110 and L C M (2530,4400)= 253 ×k, find the value of k.

2. If 0.2316 is expressed in the form of $\frac{p}{2^m 5^n}$ for the smallest value of the whole number n and m. Write the values of n, m and p.

3. Show that one and only one out of n, n+2 or n + 4 is divisible by 3, where n is any positive integer.

4. Prove that $\sqrt{3} + \sqrt{5}$ is an irrational number.

5. Use Euchild's Division Algorithm to show that the square of any positive integer is either of the form 3m or 3m + 1 for some integer m.

6. Write the HCF of the smallest composite number and the smallest prime number.

7. Show that the square of any positive odd integer is of the form 8m+1 for some integer m.

Chapter 2. Polynomials

1. If α and β are zeroes of a quadratic polynomial $6x^2 + x - 2$, find the value of $\frac{\alpha}{\beta} + \frac{\beta}{\alpha}$

2. If the product of zeroes of a quadratic polynomial $x^2 - 4x + k$ is 3, find the value of k.

3. If one of the zeroes of the polynomial $5x^2 + 13x + k$ is reciprocal of the other, then find the value of k.

4. If one of the zeroes of the polynomial $x^2 - 5x + p$ is 2. Find the other zero.

5. What should be added to the polynomial $x^2 - 5x + 4$ so that 3 is a zero of this polynomial?

6. If x+2 is a factor of $x^2+ax+2b$ and a + b = 4, then determine the values of a and b.

7. Find all the zeros of $2x^4 - 3x^3 + 6x - 2$ if you know that two of its zeros are $-\sqrt{2}$ and $\sqrt{2}$.

8. If (x – a) is the factor of the polynomial $x^3 - mx^2 - 2nax + na^2$, prove that a = m + n when $a \neq 0$.

9. On dividing $x^3 - 3x^2 + x + 2$ by a polynomial g (x), the quotient and remainder were x – 2 and –2x + 4, respectively. Find g (x).

10. If the polynomial $6x^4+8x^3-5x^2+ax+b$ is exactly divisible by the polynomial $2x^2-5$, find the value of a and b.

Chapter 3. Pair of Linear Equations in Two Variables

1. Find the values of a and b for which the following system of linear equations has infinite solutions:

   $2x - (a - 4) y = 2b + 1$

   $4x - (a - 1)y = 5b - 1$

2. Solve : $41x + 53y = 135$; $53x + 41y = 147$

3. Solve the pair of linear equations

   $(a - b) x + (a + b) y = a^2 - 2ab - b^2$

   $(a + b) (x + y) = a^2 + b^2$

4. Cars are parked in a parking place at a particular point of time in rows. If 3 cars are extra in a row, there would be one row less. If 3 cars are less in a row, there would be 2 rows more. Find the number of cars in the parking place at that particular point of time.

5. Solve for x and y:

   $\frac{1}{7x} + \frac{1}{6y} = 3; \quad \frac{1}{2x} - \frac{1}{3y} = 5$

6. Solve for u and v:

$2(3u-v) = 5uv; \quad 2(u+3v) = 5uv.$

7. A train covered a certain distance at uniform speed. If the train would have been 6 km/h faster, it would have taken 4 hours less than the scheduled time. Also if the train were slower by 6 km/h, it would have taken 6 hours more than the scheduled time. Find the length of the journey.

8. On selling a tea set at 5% loss and a lemon set at 15% gain, a crockery seller gains Rs 7. If sell the tea set at 5% gain and the lemon set at 10% gain, he gains Rs 13. Find the actual price of the tea set and the lemon set.

Chapter 4. Quadratic Equations

1. For what value of p, the quadratic equation $(3p-l)\, x^2 + 5x + (2p - 3) = 0$ has one of the roots as 0.

2. Determine if 3 is a root of the equation

   $\sqrt{x^2 - 4x + 3} + \sqrt{x^2 - 9} = \sqrt{4x^2 - 14x + 6}$

3. Solve for x : $\dfrac{1}{a+b+x} = \dfrac{1}{a} + \dfrac{1}{b} + \dfrac{1}{x}$; $a \neq 0, b \neq 0, x \neq 0$

4. Solve for x :- $12\,ab\,x^2 -- (9a^2 -- 8b^2)\,x - 6ab = 0$

5. Find the value of k for the following quadratic equation, so that it has two equal roots.

   $x^2 -- 2x(1 + 3k) + 7(3 + 2k) = 0$

6. Solve for x : $4x^2 - 4a^2x + (a^4 - b^4) = 0$

7. For what value of p , the quadratic equation $2x^2 + px + 8 = 0$ has real roots.

8. If one root of a quadratic equation is $\dfrac{2-\sqrt{3}}{2}$, then what is the other root ?

9. Two pipes running together can fill a cistern in $2\frac{8}{11}$ minutes. If one pipe takes 1 minute more than the other to fill the cistern, find the time in which each pipe would fill the cistern.

10. In a society for children each child gives a gift to every other child. If the number of gifts is 132, find the number of children.

11. B takes 16 days less than A to do a piece of work. If both working together can do it in 15 days, in how many days will B alone complete the work.

12. A Shop keeper buys a number of books for Rs 80. If he had bought 4 more books, for the same amount, each books would have cost Re. 1 less. How many books did he buy?

Chapter 5. Arithmetic Progressions

1. The angles of a triangle are in A.P. If the greatest angle equals to the sum of the other two, find the angles.

2. If first, second and the last terms of an A.P. are a, b, 2a respectively then, find sum of all the terms.

3. Find the sum of n terms of a series $\sqrt{2} + \sqrt{8} + \sqrt{18} + \ldots$

4. Which term of the A.P. 7, 12, 17, 22,…..is 30 more than 20th term?

5. 5 times of the 5^{th} term of an AP is equal to 12 times of its 12^{th} term. Find the 17th term.

6. Find three terms in A.P. whose sum is 15 and whose product is 105

7. Find the sum of all the numbers between 200 and 500 which are divisible by 7.

8. If the sum of n terms of an AP is $3n^2+5n$, then which of its term is 164?

Chapter 6. Triangles

1. If the ratio of corresponding sides of two similar triangles is 2: 3, then what is the ratio of their corresponding heights?

2. If Δ ABC ~ Δ DEF such that BC = 3cm, EF= 5cm and area of Δ ABC= $36cm^2$ find the area of Δ DEF.

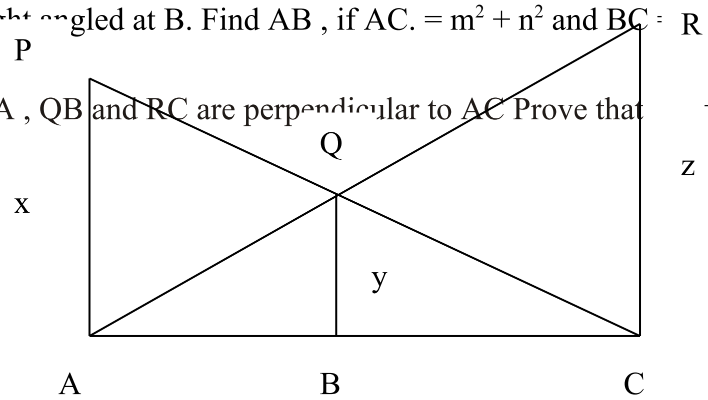
3. In Δ ABC, AB = $6\sqrt{3}$ cm, AC = 12cm and BC = 6cm, what is the measure of ∠ B?

4. If the ratio of corresponding medians of two similar triangles is 5:3 then what is the ratio of their corresponding areas?

5. If Δ ABC ~ Δ DEF and $\angle A = 47^0$ ∠ E = 83°, then write the measure of ∠ *C*.

6. Δ ABC is right angled at B. Find AB , if AC. = $m^2 + n^2$ and BC = … n^2

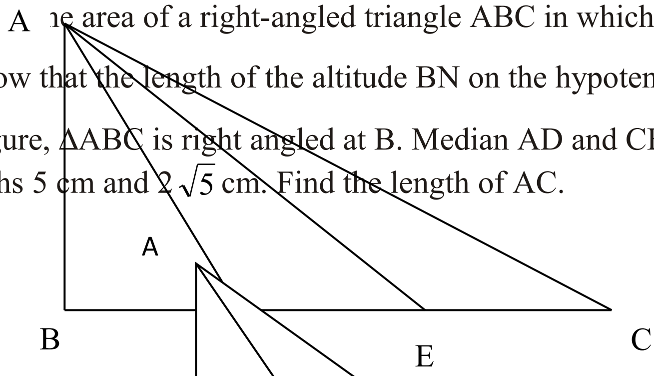
7. In figure , PA , QB and RC are perpendicular to AC Prove that $\frac{1}{x} + \frac{1}{z} = \frac{1}{y}$



8. In ΔABC, P divides side AB such that AP : PB = 1:2. Q is a point on AC such that PQ || BC. Find the ratio of areas of Δ APQ & trapezium BPQC.

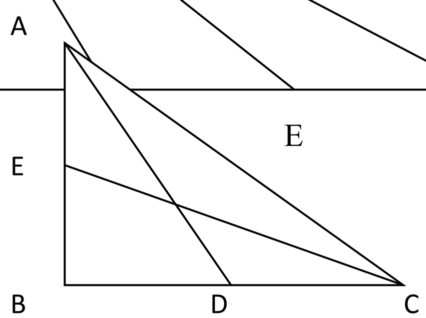
9. PQR is a right-angled triangle, having $\angle Q = 90°$, If QS = SR, Show that $PR^2 = 4\,PS^2 - 3\,PQ^2$

10. In figure , D and E trisect BC , Prove that $8\,AE^2 = 3\,AC^2 + 5AD^2$



11. If 'x' ie area of a right-angled triangle ABC in which $\angle B = 90°$ and BC = b, show that the length of the altitude BN on the hypotenuse AC is $\frac{2bx}{b^4 + 4x^2}$

12. In figure, ΔABC is right angled at B. Median AD and CE are of respective lengths 5 cm and $2\sqrt{5}$ cm. Find the length of AC.



Chapter 7. Coordinate Geometry

1. If the midpoint of the line segment joining the points P (-3,1) and Q(x,y) is (1,2), find the co-ordinates of Q.

2. If (-1,3),(1,-1) and (5,1) are the vertices of a triangle, find the length of the median through the vertex (5,1).

3. If two vertices of an equilateral triangle are A(0, 0) and B(3, 0), find the third vertex.

4. The co-ordinates of the vertices of Δ ABC are A(4,1),B(-3,2) and C(0,k). Given that the area of Δ ABC is 12 sq. units, find the value of k.

5. Find the relation between x and y such that the point P(x, y) is equidistant from the point A(2,5) and B(-3,7).
6. If the points P(x,y) is equidistant from the points A(a+b,b-a) and B (a-b,a+b) Prove that bx=ay.
7. If P (x,y) is any point on the line joining the points A(a,0) and B(0,b),then show that $\frac{x}{a} + \frac{y}{b} = 1$

8. Find the point P on the x-axis which is equidistant from the points A (5,4) and B (-2,3). Also find the area of ΔABP.
9. In what ratio does the line x-y-2=0 divide the line segment joining (3,-1) and (8, 9) ?

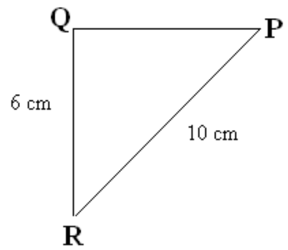
10. If the points (10, 5), (8, 4) and (6, 6) are the mid points of the sides of a triangles. Find its all three vertices and also find its area.

11. The centre of a circle is (3p+1, 2p-1). If the circle passes through the point (-1, -3) and the length of the diameter is 20 units, find the value of p.

12. One end of a line segment of length 10 units is (-3, 2). If the ordinate of the other end is 10, prove that the abscissa will be 3 or -9.

Chapter 8. Introduction to Trigonometry

1. If 3 tan A = Cot A and A is an acute angle, find $\angle A$.
2. In the given fig $\angle$ Q=90°, find the value of tan P -cot R.



3. If Cos A= 2/3 and A + B = 90°, find the value of Sin B.
4. Find the value of θ ($0^0 < \theta < 90^0$) if Cos 63°. Sec (90^0 - θ) =1
5. If and $0° < \theta < 90°$, find the angle θ.

6. If A, B, C are the interior angles of a triangle ABC, Show that

$$\sin\frac{B+C}{2}\ \cos\ A/2\ +\ \cos\frac{B+C}{2}\ \sin A/2 = 1.$$

7. If $\sin\theta + \cos\theta = \sqrt{2}\cos(90-\theta)$, find $\cot\theta$.

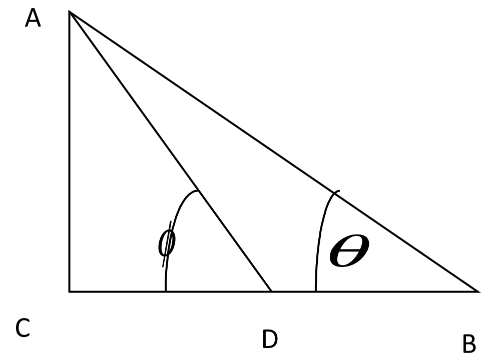
8. If $\sec\theta = x + \frac{1}{4x}$, Prove that $\sec\theta + \tan\theta = 2x$ Or $\frac{1}{2x}$.

9. If $\frac{\cos\alpha}{\cos\beta} = m$ and $\frac{\cos\alpha}{\sin\beta} = n$, show that $(m^2 + n^2)\cos^2\beta = n^2$.

10. In the given figure, ABC is a right angled triangle.

D is the midpoint of BC. Show that

$\frac{\tan\theta}{\tan\phi} = \frac{1}{2}$.



11. Without using trigonometric tables prove that tan 1° tan 2° tan 3°… tan 89°=1

12. Given that $\tan(\theta_1+\theta_2) = \frac{\tan\theta_1 + \tan\theta_2}{1 - \tan\theta_1\tan\theta_2}$, find $(\theta_1+\theta_2)$ when $\tan\theta_1 = \frac{1}{2}$ and $\tan\theta_2 = \frac{1}{3}$

13. If $\sec\theta + \tan\theta = x$, obtain the value of $\sec\theta$ & $\tan\theta$

14. If $\tan\theta + \sin\theta = m$ and $\tan\theta - \sin\theta = n$, show that $m^2 - n^2 = 4\sqrt{mn}$

15. If $\cos\theta + \sin\theta = \sqrt{2}\cos\theta$ prove that, $\cos\theta - \sin\theta = \sqrt{2}\sin\theta$

16.
If $x = r\sin\alpha.\cos\beta$, $y = r\sin\alpha.\sin\beta$ and $z = r\cos\alpha$ prove that, $r^2 = x^2 + y^2 + z^2$

Chapter 9.Some Application of Trigonometry

1. A kite is flying at a height of $40\sqrt{3}$ m from the level ground, attached to a string inclined at 60° to the horizontal. Find the length of the string, assuming that there is no slack in the string.

2. From a window, h meter above the ground of a house in a street , the angle of elevation and depression of the top and the foot of another house on the opposite side of the street are θ and ϕ respectively. Show that the height of the opposite house is h (1 + $\tan\theta$.$\cot\phi$).

3. A round balloon of radius **r** subtends an angle α at the eye of the observer while the angle of elevation of its centre is β. Prove that the height of the centre of the balloon is **r** sinβ.cosec α/2

4. The angle of elevation of a jet fighter from a point A on the ground is 60º. After a flight of 15 sec, the angle of elevation changes to 30°. If the jet is flying at a speed of 720 km/hr, find the constant height at which the jet is flying.

5. A man on a top of a tower observes a truck at angle of depression α where tan α $= \frac{1}{\sqrt{5}}$ and sees that it is moving towards the base of the tower. Ten minutes later, the angle of depression of the truck is found to be β where tan β = $\sqrt{5}$. If the truck is moving at uniform speed determine how much more time it will take to reach the base of the tower.

6. If the angle of elevation of cloud from a point h metres above a lake is α and the angle of depression of its reflection in the lake be β, prove o observation is $\frac{2h\sec\alpha}{\tan\beta - \tan\alpha}$.

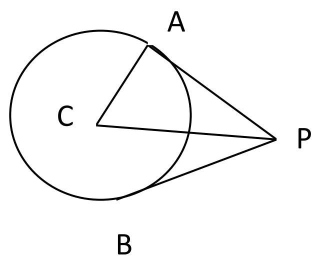
7. A man standing on the deck of a ship which is 10 m above the water level, observes the angle of elevation of the top of a hill as 60° and the angle of depression of the base of the hill as 30°. Calculate the distance of the hill from the ship and the height of the hill.
8. A vertical tower stands on a horizontal plane and is surmounted by a vertical flagstaff of height h. At a point on the plane, the angle of elevation of the bottom and the top of the flagstaff are α and β respectively. Prove that the height of the tower is $\frac{h\tan\alpha}{\tan\beta - \tan\alpha}$

9. The angle of elevation of a cloud from a point 60m above a lake is 30° and the angle of depression of the reflection of the cloud in the lake is 60°. Find the height of the cloud.

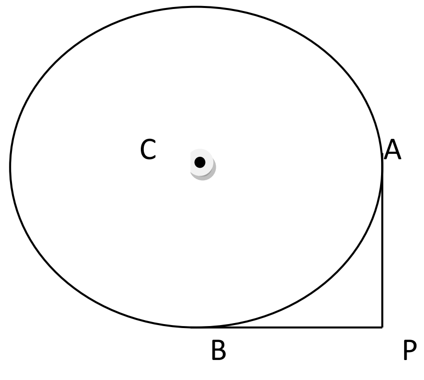
10. At a point on level ground, the angle of elevation of a vertical tower is found to be such that its tangent is $\frac{5}{12}$. On walking 192 m towards the tower, the tangent of the angle is found to be $\frac{3}{4}$. Find the height of the tower.

Chapter 10. Circles

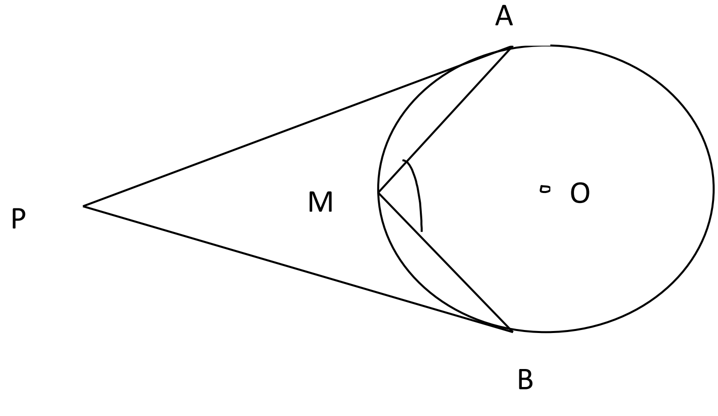
1. PA and PB are tangents from P to a circle with centre C. If ∠ APB = 80°, find ∠ ACP



2. PA and PB are tangents to a circle from P with centre C. If the radius of the circle is 4 cm and PA ⊥ PB . Then find the length of each tangent.

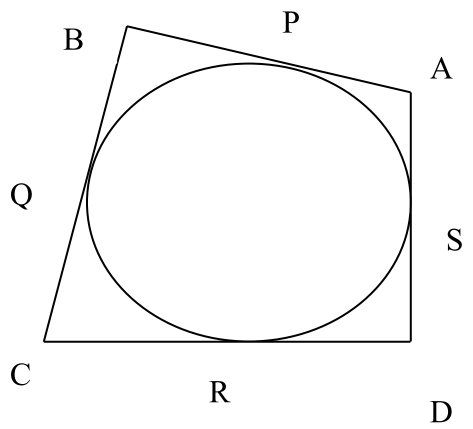


3. In the given figure, PA and PB are the tangents to the circle with centre O. $\angle APB = 80^0$ find the $\angle AMB$.

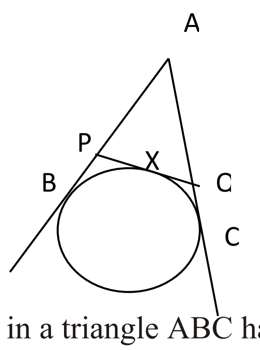


4. Two tangents PA and PB are drawn to the circle with centre O such that $\angle APB = 120^0$, P is an external point, show that OP =2 AP.

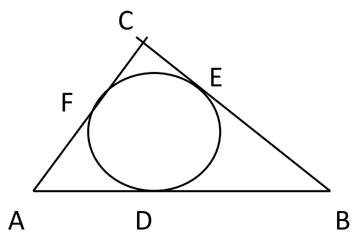
5. ABCD is quadrilateral such that $\angle D = 90^\circ$, A circle C (O, r) touches the sides AB, BC , CD and AD at P,Q,R and S respectively, If BC = 38 cm, CD = 25 cm and BP = 27cm find the radius of the circle.



6. ABC is a right-angled triangle, right angled at 'A'. A circle is inscribed in it. The length of the two sides containing the right angles are 5 cm and 12 cm. Find the radius of the circle.
7. If AB, AC and PQ are tangents to the circle and AB=6cm, find the perimeter of the triangle APQ.



8. A circle is inscribed in a triangle ABC having sides BC=8cm, AC=10cm and AB=12 cm as shown in the figure. Fid AD, BE and CF.

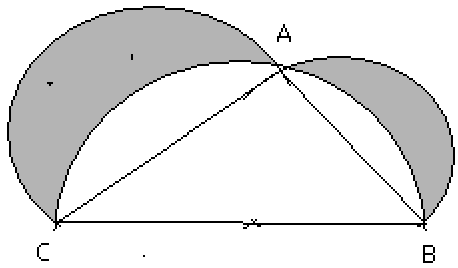


Chapter 11. Constructions

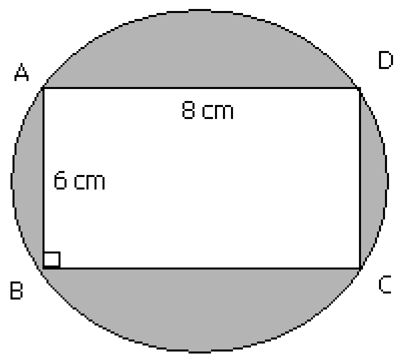
1. Construct a ΔABC in which $\angle B=120°$, BA= 4cm and BC=5 cm. Construct another $\Delta AB'C'$similar to ΔABC such that AB'= $\frac{5}{4}AB$
2. Draw a pair of tangents to a circle of radius 5 cm which are inclined to each other at an angle of 45°.
3. Construct a ΔABC in which AB = 4.8 cm, BC = 6 cm and AC = 5.5 cm. Draw another triangle whose sides are 1 ½ times the corresponding sides of the given triangle.

Chapter 12. Areas Related to Circles

1. A square circumscribes a circle of radius 5 cm. Find the length of the diagonal of the square.
2. The perimeter of a protractor is 36 cm. Find its diameter.
3. The length of a minute hand of a clock is 7cm. What is the area swept by it from7.00 am to 7.15 am?
4. If the perimeter and area of a circle are numerically equal then what is its radius?
5. In the given figure, $\angle BAC = 90°$, AB = 6cm, AC = 8 cm. Two semi circles with diameter AB and AC are drawn. Find the area of the shaded region.



6. In the given figure, find the area of the shaded region (use π=3.14)



Chapter 13. Surface Areas and Volumes

1. What is the radius of a cylinder whose volume and curved surface area are numerically equal?
2. Two cubes each of volume 64 cm^3 are joined face to face. What is the surface area of the resulting cuboid?
3. A piece of paper is in the form of a semicircular region of radius 10 cm .It is rolled to form a right circular cone. What is the radius of the cone?
4. The largest possible sphere is carved out of a cube of wood of side 21 cm; find the volume of the remaining wood.
5. A sphere and a cube have the same surface area. Show that the ratio of the volume of the sphere to that of cube is $\sqrt{6}$: $\sqrt{\pi}$.
6. If h, Cand V respectively are the height, the curved surface area and volume of the cone. Prove that $3\pi Vh3-C^2h^2+9V^2=0$.
7. Water is flowing at the rate of 15 km/h through a pipe of diameter 14 cm into a rectangular tank which is 50 m long and 44m wide. Find the time in which the level of water in the tank will rise by 21cm?
8. A hollow cone is cut by a plane parallel to the base and upper portion is removed. If the curved surface area of the remainder is 8/9 of the curved surface area of the whole cone, Find the ratio of the line segment into which the altitude of the cone is divided by the plane.

9. Two spheres of the same metal weight 1 kg and 7 kg. The radius of the smaller sphere is 3cm. The two spheres are melted to form a single big sphere. Find the diameter of the big sphere.

10. A Copper wire 3mm in diameter is wound about a cylinder of length 120 cm and diameter 10 cm, so as to cover the curved surface of cylinder. Find the length and mass of the wire assuming the density of copper to be 8.88 gm/$cm^{3.}$

11. A circus tent is made of canvas, and is in the form of a right circular cylinder and a right circular cone above it. The Diameter and height of the cylindrical part of the tent are 126 meter and 5 meter respectively. The total height of the tent is 21 meter. Find the total cost of the canvas used to make the tent when the cost per square meter of the canvas is Rs 12. {Take π=22/7}

12. A bucket is in the form of frustum of a cone with a capacity of 12308.8 cm^3 of water. The radii of a top and bottom circular ends are 20 cm and 12 cm respectively. Find the height of the bucket and area of the metal sheet used in its making. [Take π =3.14]

13. A toy is in the shape of right circular cylinder with the hemisphere on one end and a cone on the other end. The height and radius of the cylindrical part are 13 cm and 5 cm respectively. The radii of the hemispherical and conical parts are the same as that of the cylindrical part. Calculate the surface area of the toy if the height of the conical part is 30 cm. [Take π =3.14]

14. The surface area of a sphere and a cube are equal. Prove that their volumes are in the ratio $1:\sqrt{\frac{\pi}{6}}$

15. A sector of a circle of radius 15cm has the angle 120^0. It is rolled up so that two bounding radii are joined together to form a cone. Find the volume of the cone.

16. A cylindrical container of radius 6cm and height 15cm is filled with ice-cream. The whole ice-cream is distributed among 10 children in equal cones having hemispherical top. If the height of the conical portion is four times the radius of the base find the radius of the base.

Chapter 14. Statistics

1. What is the mean of all the prime numbers less than 20?
2. What measure of the central tendency is represented by the abscissa of the point where less than ogive and more than ogive intersect?
3. Median and mode for a distribution are 22 and 20 respectively. Find the mean of the distribution.
4. The mean of the following frequency table is 53. Find the missing frequencies.

Age in years	0-20	20-40	40-60	60-80	80-100	Total
No of people	15	x	21	y	17	100

5. Frequency table of the marks obtained by 50 students is given below.

Marks	0-10	10-20	20-30	30-40	40-50	50-60
No. of students	3	f_1	20	10	5	f_2

If the median marks are 28.5, find the missing frequencies.

6. Daily pocket expenses in rupees of 80 students of a school are given in the following table.

Expenses in Rs.	0-5	5-10	10-15	15-20	20-25	25-30	30-35
No. of students	5	15	20	10	10	15	5

Draw the 'less than' and 'more than' ogive on the same graph. Find the median of the frequency distribution from the above graph.

7. Find the mode, median and the mean of the following data.

Marks obtained	25-35	35-45	45-55	55-65	65-75	75-85
No of students	7	31	33	17	11	1

8. What are the lower limit of the median class and the modal class of the following frequency distribution?

Age in years	0-10	10-20	20-30	30-40	40-50	50-60
No. of patients	16	13	6	11	27	18

Chapter 15. Probability

1. Two dice are thrown once. What is the probability of getting a doublet?
2. A jar contains 54 marbles of colour blue, green and white. The probability of selecting a blue marble at random from the jar is 1/3 and the probability of selecting a green marble at random is 4/9. How many white marbles do the jar contains?

3. In a leap year, find the probability that there are 53 Sundays in the year.
4. A letter is chosen at random from the word MISSISSIPPI. Find the probability of getting i) a vowel. ii) a consonant.
5. A bag contains 4 whit balls, 6 red balls and 7 black balls. One ball is drawn at random from the bag. What is the probability that the ball drawn is i) not a black ball ii) neither white nor black iii) red or white.
6. A box has cards numbered from 20 to 100. Cards are mixed thoroughly and a card is drawn from the box at random. Find the probability that the number on the card drawn from the box is i) an odd number ii) a perfect square number and iii) a number divisible by 7.

Hints for solving the problems

Chapter 1. Real Numbers

1. Use the formula LCM= $\frac{a \times b}{HCF}$
3. Use Euclid's algorithm $a=b\times q+r,\ 0\leq r<3$.
7. Assume x to be a positive odd integer. Then it is of the form $x=4k+1$, $4k+3$ for some integer k. Proceed by squaring both sides $x^2=(4k+1)^2$

Chapter 2. Polynomials

1. $\alpha^2+\beta^2=(\alpha+\beta)^2-2\alpha\beta$
2. The product of zeroes = $\frac{c}{a}$
3. $\frac{c}{a}=1$
4. Apply factor theorem.
8. Apply factor theorem.
9. Dividend = divisor ×quotient + remainder
10. Divide and equate the coefficient and the constant term of the remainder to zero separately.

Chapter 3. Pair of Linear Equations in Two Variables

1. Apply the condition for infinite solutions.
2. Add and subtract the two equations and solve.
3. Simplify the second equation to the standard form and solve.

6. Divide by uv

7. Assume the speed of the train to be x km/h and the time taken to be y hours.

8. SP=CP$\times\frac{100 \pm gain/loss}{100}$.

Chapter 4. Quadratic Equations

1. $\frac{c}{a} = 0$
2. Substitute the value for x.
3. Transpose the term $\frac{1}{x}$ and simplify.
4. Split the middle term and factorise.
5. D=0
6. Solve by any method.
7. D≥0.
8. Conjugate root.
9. Apply unitary method to get the equation.
10. If x is the number of children, then number of gifts given by each child will be x-1.
11. Apply unitary method to get the equation.

Chapter 5. Arithmetic Progressions

1. Angle sum property; assume the angles as a-d, a, a+d.
2. Find n, the number of terms of the AP.
3. Simplify and find d.

5. $5a_5=12a_{12.}$

6. Assume the terms as a-d, a, a+d.

8. Find $S_{1,}$ S2, etc. Then $a_1= S_1$ and $a_2= S_2- S_1$ etc.

Chapter 6. Triangles

1. The ratio of the sides of two similar triangles is equal to the ratio of their corresponding altitudes.

3. Apply the converse of Pythagoras theorem.

4. The ratio of the areas of two similar triangles is equal to the ratio of the squares of their corresponding medians.

5. Equate the corresponding angles.

6. Apply Pythagoras theorem.

7. Apply similarity of triangles.

8. Apply similarity of triangles to Δ APQ and Δ ABC.

10. Take BD=DE=EC=x; apply Pythagoras theorem.

11. $\frac{1}{2} AB \times BC = \frac{1}{2} AC \times BN$

Chapter 7. Coordinate Geometry

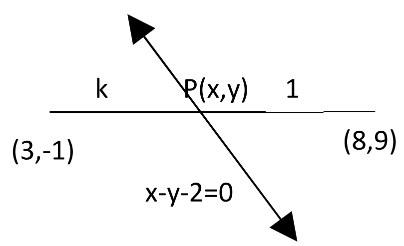
1. Apply mid-point formula.

3. AB=BC=CA.

7. The area of a triangle formed by three collinear points=0.

8. Find the co-ordinates of P and calculate the area.

9. Find the coordinates of P and put the value of x and y in the given equation.



10. Use mid point formula.

11. Use distance formula which is the radius.

12. Assume the coordinates of the other end(x, 10) and use distance formula.

Chapter 8. Introduction to Trigonometry

3. Apply B=90°-A.

6. A+B+C=180°

7. Transpose sinθ.

8. $\sec^2\theta=1+\tan^2\theta$.

9. Square and add.

11. Associate the trigonometric functions of complementary angles.

12. Substitute the values of $\tan\theta_1$ and $\tan\theta_2$.

13. Apply trigonometric identities.

14. Square and subtract.

15. Transpose cos θ.

16. Square and add.

Chapter 9.Some Application of Trigonometry

9. Object distance = image distance.

10.Assume $\tan\theta_1 = \frac{5}{12}$ and $\tan\theta_2 = \frac{3}{4}$.

Chapter 10. Circles

2. Join AC and BC to complete the square.

3. Join OA and OB.

4. Apply the value of cos θ.

6. Find the third side of the triangle and apply the property of tangents from an external point.

Chapter 12. Areas Related to Circles

1. Diameter of the circle = side of the square.

5. Area of the shaded region= Sum of the areas of two smaller semicircles+ area of the triangle-area of the larger semi circle.

6. Diagonal of the rectangle = diameter of the circle.

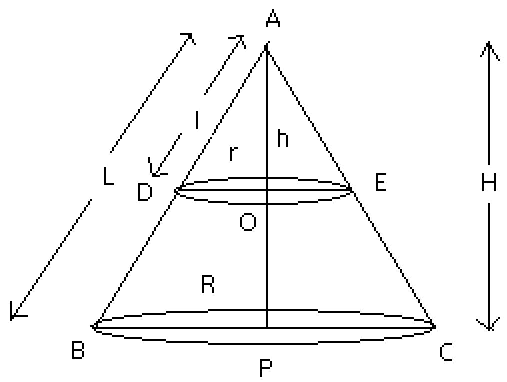
Chapter 13. Surface Areas and Volumes

3. Circumference of the semicircle= circumference of the base of the cone.

6. Assume the radius as r and slant height as l; Substitute the values of C and V in the equation in terms of r, h and l.

7. Volume of water flowing through the pipe per unit time = area of its cross section ×speed of water.

8. $\Delta AOD \sim \Delta APB$. $\dfrac{surface\ area\ of\ the\ small\ cone}{surface\ area\ of\ the\ large\ cone} = \dfrac{1}{9}$



9. Mass=Volume×density; Ratio of volumes of two spheres=ratio of their mass.

10. Number of turns=height of the cylinder÷diameter of the wire. Length of the wire=No. of turns ×Circumference of the base of the cylinder.

11. Area of the canvas = CSA of the cone + CSA of the cylinder.

12.Apply the formula of volume of the frustum of a cone to get the height of the bucket. Area of the metal sheet= CSA of the bucket + area of the base.

13. Total surface of the toy=CSA of the cylinder + CSA of hemisphere + CSA of the cone.

15. Area of the sector= CSA of the cone. Radius of the sector= slant height of the cone.

16. Volume of the ice cream cone with hemispherical top = volume of the cone + volume of hemisphere.

Chapter 14. Statistics

Chapter 15. Probability

2. B + G + W = 54; $P_{(B)}$=1/3 ; $P_{(G)}$=4/9.

3. In a leap year, there are 366 days=52 weeks+2 days. These two days can be (Su, M), (M, T), (T,W), (W,Th), (Th,F), (F,S), (S,Su)