LAST MINUTE MOST IMPORTANT QUESTIONS FOR SA-II
QUADRATIC EQUATIONS

Solve for x:

1. $\frac{1}{a+b+x}=\frac{1}{a}+\frac{1}{b}+\frac{1}{x},[x\neq 0,-(a+b)]$

2. $\frac{1}{x-3}-\frac{1}{x+5}=\frac{1}{6},(x\neq 3,-5)$

3. $\frac{1}{x+4}-\frac{1}{x-7}=\frac{11}{30},(x\neq -4,7)$

4. $\frac{1}{x-2}+\frac{1}{x-4}=\frac{4}{3},(x\neq 2,4)$

5. $a^2b^2x^2+b^2x-a^2x-1=0$

6. $4\sqrt{3}x^2+5x-2\sqrt{3}=0$

7. $(a+b)^2x^2-4abx-(a-b)^2=0$

8. $4x^2-2(a^2+b^2)x+a^2b^2=0$

9. $9x^2-9(a+b)x+(2a^2+5ab+2b^2)=0$

10. $4x^2-4a^2x+(a^4-b^4)=0$

11. $3\sqrt{7}x^2+4x-\sqrt{7}=0$

12. $\sqrt{7}x^2-6x-13\sqrt{7}=0$

13. Find the value of k for which the quadratic equation $(k-12)x^2+2(k-12)x+2=0$ has two real equal roots..

14. Find the value of k for which the quadratic equation $k^2x^2-2(k-1)x+4=0$ has two real equal roots..

15. A motor boat whose speed is 18 km/hr in still water takes 1 hour more to go 24 upstream than to return to the same point. Find the speed of the stream.

16. 300 apples are distributed equally among a certain number of students. Had there been 10 more students, each would have received one apple less. Find the number of students.

17. Rs 250 was divided equally among a certain number of children. If there were 25 more children, each would have received 50 paise less. Find the number of children.

18. A train travels 360 km at a uniform speed. If the speed had been 5 km/h more, it would have taken 1 hour less for the same journey. Find the speed of the train.

19. A pole has to be erected at a point on the boundary of a circular park of diameter 13 metres in such a way that the differences of its distances from two diametrically opposite fixed gates A and B on the boundary is 7 metres. Is it possible to do so? If yes, at what distances from the two gates should the pole be erected?

20. In a class test, the sum of Shefali's marks in Mathematics and English is 30. Had she got 2 marks more in Mathematics and 3 marks less in English, the product of their marks would have been 210. Find her marks in the two subjects.

21. Two water taps together can fill a tank in $9\frac{3}{8}$ hours. The tap of larger diameter takes 10 hours less than the smaller one to fill the tank separately. Find the time in which each tap can separately fill the tank.

22. Out of a number of saras birds, one-fourth of the number are moving about in lots, $\frac{1}{9}$th coupled with $\frac{1}{4}$th as well as 7 times the square root of the number move on a hill, 56 birds remain in vakula trees. What is the total number of trees?

23. A two digit number is such that the product of its digits is 18. When 63 is subtracted from the number, the digits interchange their places. Find the number.

24. In a flight for 6000 km, an aircraft was slowed down due to bad weather. Its average speed for the trip was reduced by 400 km/hr and consequently time of flight increased by 30 minutes. Find the original duration of flight.

25. A peacock is sitting on the top of a pillar, which is 9m high. From a point 27 m away from the bottom of the pillar, a snake is coming to its hole at the base of the pillar. Seeing the snake the peacock pounches on it. If their speeds are equal at what distance from the whole is the snake caught?

ARITHMETIC PROGRESSIONS

1. Find the value of x for which (8x + 4), (6x – 2) and (2x + 7) are in AP.

2. Find the 20th term from the last term of the AP : 3, 8, 13, . . ., 253.

3. Find the 10th term from the last term of the AP : 8, 10, 12, . . ., 126.

4. Find the 31st term of an AP whose 11th term is 38 and the 16th term is 73.

5. Which term of the AP 9, 12, 15, 18,…. will be 39 more than its 36^{th} term?

6. Which term of the AP 3, 15, 27, 39,…. will be 120 more than its 21^{st} term?

7. Find the sum of all three digit natural numbers which are multiples of 7.

8. Find the sum of all three digit natural numbers which are divisible by 13.

9. The sum of n terms of an AP is $(5n^2 - 3n)$. Find the AP and hence find its 10^{th} term.

10. The sum of n terms of an AP is $\left(\frac{5n^2}{2} + \frac{3n}{2}\right)$. Find its 20^{th} term

11. If the sum of first 7 terms of AP is 49 and that of first 17 terms is 289, find the sum of first n terms.

12. Find the number of terms of the AP 63, 60, 57, ……. so that their sum is 693. Explain the double answer.

13. The sum of first 9 terms of an AP is 81 and the sum of its first 20 terms is 400. Find the first term and the common difference of the AP.

14. A sum of Rs. 1000 is invested at 8% simple interest per year. Calculate the interest at the end of each year. Does this interest form an AP? If so, find the interest at the end of 30 years.

15. In a flower bed, there are 23 rose plants in the first row, 21 in the second, 19 in the third, and so on. There are 5 rose plants in the last row. How many rows are there in the flower bed?

16. The sum of the 4th and 8th terms of an AP is 24 and the sum of the 6th and 10th terms is 44. Find the first three terms of the AP.

17. 200 logs are stacked in the following manner: 20 logs in the bottom row, 19 in the next row,18 in the row next to it and so on. In how may rows are the 200 logs placed and how many logs are in the top row?

18. A man repays a loan of Rs. 3250 by paying Rs. 20 in the first month and then increase the payment by Rs. 15 every month. How long will it take him to clear the loan?

19. In a school, students thought of planting trees in and around the school to reduce air pollution. It was decided that the number of trees, that each section of each class will plant, will be the same as the class, in which they are studying, e.g., a section of Class I will plant 1 tree, a section of Class II will plant 2 trees and so on till Class XII. There are three sections of each class. How many trees will be planted by the students?

20. A manufacturer of TV sets produced 600 sets in the third year and 700 sets in the seventh year. Assuming that the production increases uniformly by a fixed number every year, find : (i) the production in the 1st year (ii) the production in the 10th year (iii) the total production in first 7 years

COORDINATE GEOMETRY

1. Find the value of k if the points A(2, 3), B(4, k) and C(6, –3) are collinear.

2. Find a relation between x and y if the points (x, y), (1, 2) and (7, 0) are collinear.

3. Find a point on the y-axis which is equidistant from the points A(6, 5) and B(– 4, 3).

4. Show that the points A(5, 6), B(1, 5), C(2, 1) and D(6, 2) are vertices of a square.

5. Show that the points A(1, –3), B(13, 9), C(10, 12) and D(–2, 0) are vertices of a rectangle.

6. Show that the points A(1, 0), B(5, 3), C(2, 7) and D(–2, 4) are vertices of a rhombus.

7. Prove that the points A(–3, 0), B(1, –3) and C(4, 1) are the vertices of an isosceles right-angled triangle. Find the area of this triangle.

8. If the points P(a, –11), Q(5, b), R(2, 15) and S(1, 1) are the vertices of a parallelogram PQRS, find the value of a and b.

9. 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.

10. If the points A(6, 1), B(8, 2), C(9, 4) and D(*p*, 3) are the vertices of a parallelogram, taken in order, find the value of *p*.

11. If A(–5, 7), B(– 4, –5), C(–1, –6) and D(4, 5) are the vertices of a quadrilateral, find the area of the quadrilateral ABCD.

12. Find a point P on the *y*-axis which is equidistant from the points A(6, 5) and B(– 4, 3). Also find the area of ΔPAB.

13. Find the coordinates of the circumcentre of a triangle whose vertices are A(4, 6), B(0, 4) and C(6, 2). Also, find its circumradius.

14. Find the values of *y* for which the distance between the points P(2, – 3) and Q(10, *y*) is 10 units.

15. Find the coordinates of the points which divide the line segment joining the points (–2, 0) and (0, 8) in four equal parts.

16. The consecutive vertices of a parallelogram ABCD are A(1, 2), B(1, 0) and C(4, 0). Find the fourth vertex D.

17. Find the ratio in which the point P(m, 6) divides the line segment joining the point A(–4, 3) and B(2, 8). Also find the value of m.

18. If the points A(–2, –1), B(a, 0), C(4, b) and D(1, 2) are the vertices of a parallelogram, taken in order, find the value of *a and b*.

19. Find the ratio in which the line segment joining A(1, – 5) and B(– 4, 5) is divided by the *x*-axis. Also find the coordinates of the point of division.

20. If A(–5, 7), B(– 4, –5), C(–1, –6) and D(4, 5) are the vertices of a quadrilateral, find the area of the quadrilateral ABCD.

SOME APPLICATIONS TO TRIGONOMETRY

1. The angles of depression of the top and the bottom of an 8 m tall building from the top of a multi-storeyed building are 30° and 45°, respectively. Find the height of the multi-storeyed building and the distance between the two buildings.

2. A man standing on the deck of ship, which is 10m above the water level, observes the angle of elevation of the top of a hill as 60^0 and the angle of depression of the base of the hill as 30^0. Calculate the distance of the hill from the ship and the height of the hill.

3. The angle of elevation of the top of a building from the foot of the tower is 30° and the angle of elevation of the top of the tower from the foot of the building is 60°. If the tower is 50 m high, find the height of the building.

4. A tower stands vertically on the ground. From a point on the ground, which is 15 m away from the foot of the tower, the angle of elevation of the top of the tower is found to be 60°. Find the height of the tower.

5. A 1.5 m tall boy is standing at some distance from a 30 m tall building. The angle of elevation from his eyes to the top of the building increases from 30° to 60° as he walks towards the building. Find the distance he walked towards the building.

6. From a point on the ground, the angles of elevation of the bottom and the top of a transmission tower fixed at the top of a 20 m high building are 45° and 60° respectively. Find the height of the tower.

7. A statue, 1.6 m tall, stands on the top of a pedestal. From a point on the ground, the angle of elevation of the top of the statue is 60° and from the same point the angle of elevation of the top of the pedestal is 45°. Find the height of the pedestal.

8. A statue, 1.6 m tall, stands on the top of a pedestal. From a point on the ground, the angle of elevation of the top of the statue is 60° and from the same point the angle of elevation of the top of the pedestal is 45°. Find the height of the pedestal.

9. A 1.2 m tall girl spots a balloon moving with the wind in a horizontal line at a height of 88.2 m from the ground. The angle of elevation of the balloon from the eyes of the girl at any instant is 60°. After some time, the angle of elevation reduces to 30°. Find the distance travelled by the balloon during the interval.

10. A straight highway leads to the foot of a tower. A man standing at the top of the tower observes a car at an angle of depression of 30°, which is approaching the foot of the tower with a uniform speed. Six seconds later, the angle of depression of the car is found to be 60°. Find the time taken by the car to reach the foot of the tower from this point.

11. The angles of elevation of the top of a tower from two points at a distance of 4 m and 9 m from the base of the tower and in the same straight line with it are complementary. Prove that the height of the tower is 6 m.

12. A tree breaks due to storm and the broken part bends so that the top of the tree touches the ground making an angle 30° with it. The distance between the foot of the tree to the point where the top touches the ground is 8 m. Find the height of the tree.

13. The angle of elevation of a jet plane from a point A on the ground is 60^0. After a flight of 15 seconds, the angle of elevation changes to 30^0. If the jet plane is flying at a constant height of $1500\sqrt{3}$ m, find the speed of the jet plane.

14. The angle of elevation of a jet plane from a point A on the ground is 60^0. After a flight of 30 seconds, the angle of elevation changes to 30^0. If the jet plane is flying at a constant height of $3600\sqrt{3}$ m, find the speed of the jet plane.

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

CIRCLES

1. Prove that "The tangent at any point of a circle is perpendicular to the radius through the point of contact".

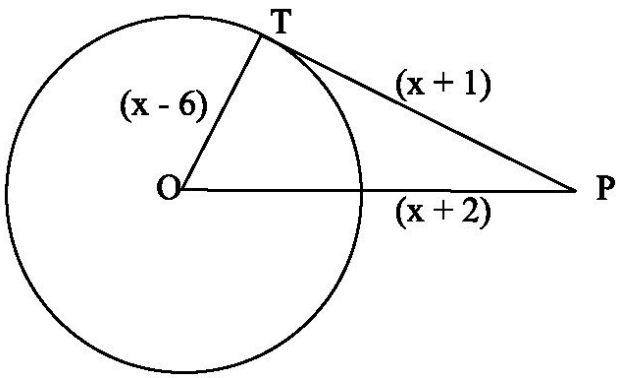
2. Prove that "The lengths of tangents drawn from an external point to a circle are equal."

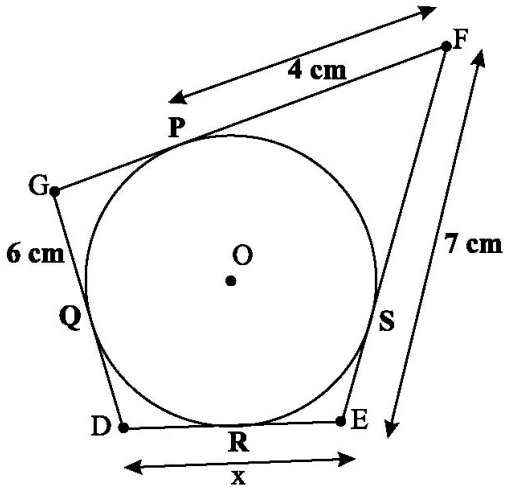
3. The incircle of ΔABC touches the sides BC, CA and AB at D, E and F respectively. If AB = AC, prove that BD = CD.

4. A circle touches all the four sides of a quadrilateral ABCD with AB = 6 cm, BC = 7cm and CD = 4 cm. Find AD.

5. Prove that the intercept of a tangent between two parallel tangents to a circle subtends a right angle at the center of the circle.

6. In the below figure, find the actual length of sides of ΔOTP.





7. In the above sided figure, find the value of x.

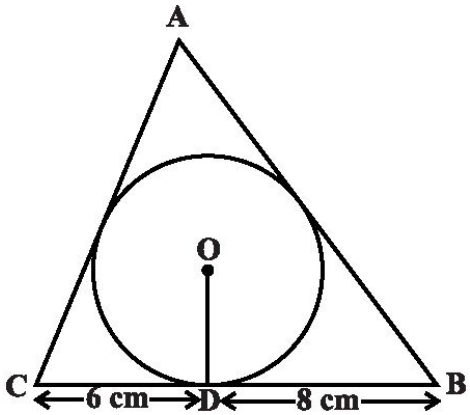
8. A circle is touching the side BC of ΔABC at P and is touching AB and AC when produced at Q and R respectively. Prove that AQ = ½ (Perimeter of Δ ABC).

9. Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that ∠PTQ = 2∠OPQ.

10. PQ is a chord of length 8 cm of a circle of radius 5 cm. The tangents at P and Q intersect at a point T. Find the length TP.

11. A quadrilateral ABCD is drawn to circumscribe a circle. Prove that AB + CD = AD + BC

12. A triangle ABC is drawn to circumscribe a circle of radius 4 cm such that the segments BD and DC into which BC is divided by the point of contact D are of lengths 8 cm and 6 cm respectively. Find the sides AB and AC.



13. Prove that opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle.

14. If PQ and RS are two parallel tangents to a circle with centre O and another tangent X, with point of contact C intersects PQ at A and RS at B. Prove that $\angle AOB = 90^o$.

15. Prove that the parallelogram circumscribing a circle is a rhombus.

CONSTRUCTIONS

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

2. Draw a triangle ABC with side BC = 7 cm, $\angle B = 45°$, $\angle A = 105°$. Then, construct a triangle whose sides are $\frac{4}{3}$ times the corresponding sides of ΔABC.

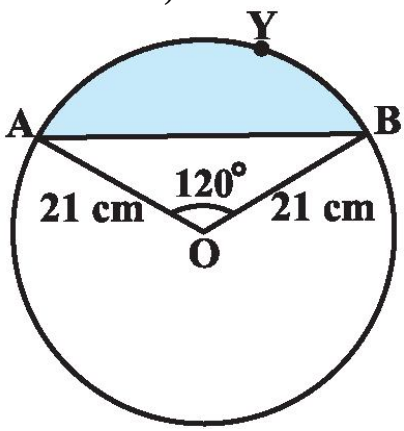
3. Draw a pair of tangents to a circle of radius 5 cm which are inclined to each other at an angle of 60°.

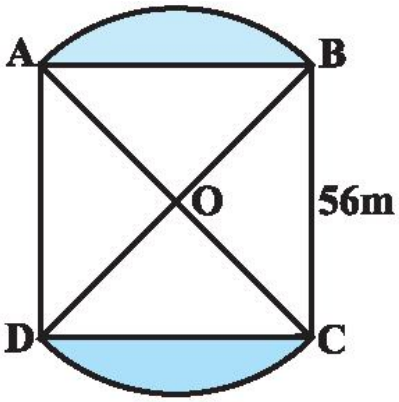
4. Draw a line segment AB of length 8 cm. Taking A as centre, draw a circle of radius 4 cm and taking B as centre, draw another circle of radius 3 cm. Construct tangents to each circle from the centre of the other circle.

5. Draw a circle of radius 7cm. From a point P, 8cm away from its centre, Construct a pair tangents to the circle. Measure the length of the tangent segments.

AREAS RELATED TO CIRCLES

1. Find the area of the segment AYB shown in Fig., if radius of the circle is 21 cm and $\angle AOB = 120°$. (Use $\pi = 22/7$).





2. In above right sided Fig, two circular flower beds have been shown on two sides of a square lawn ABCD of side 56 m. If the centre of each circular flower bed is the point of intersection O of the diagonals of the square lawn, find the sum of the areas of the lawn and the flower beds.

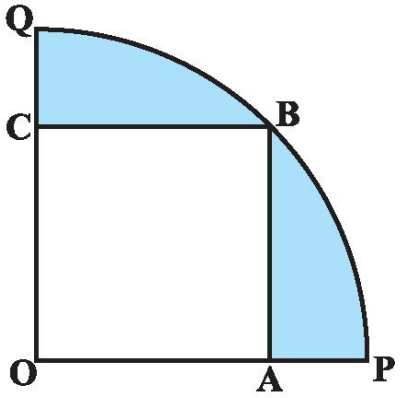
3. Find the area of a quadrant of a circle whose circumference is 22 cm.

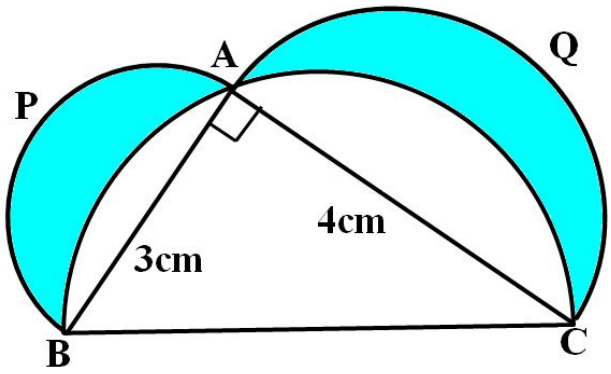
4. A chord of a circle of radius 10 cm subtends a right angle at the centre. Find the area of the corresponding : (i) minor segment (ii) major sector. (Use $\pi = 3.14$)

5. Area of a sector of central angle 200° of a circle is 770 cm^2. Find the length of the corresponding arc of this sector.

6. Find the area of the sector of a circle of radius 5 cm, if the corresponding arc length is 3.5 cm.

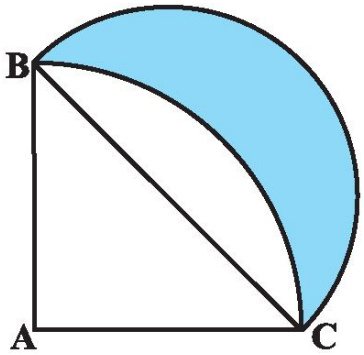
7. In Fig., a square OABC is inscribed in a quadrant OPBQ. If OA = 20 cm, find the area of the shaded region. (Use $\pi = 3.14$)

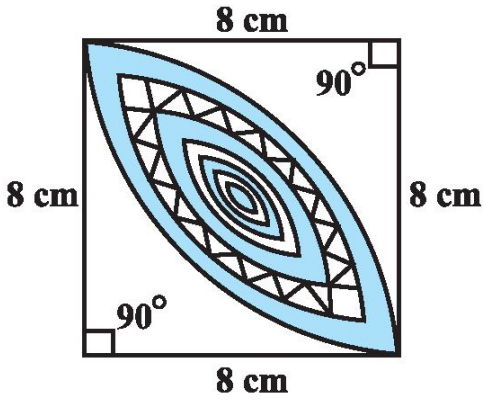




8. In the above right sided figure, ΔABC is right angled at A. Semicircles are drawn on AB, AC and BC as diameters. It is given that AB = 3cm & AC = 4cm. Find the area of the shaded region.

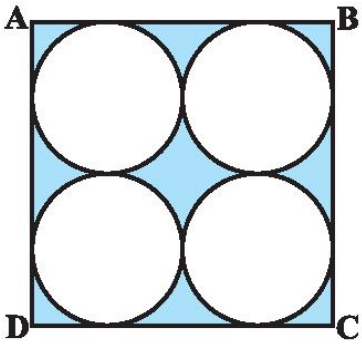
9. In Fig., ABC is a quadrant of a circle of radius 14 cm and a semicircle is drawn with BC as diameter. Find the area of the shaded region.

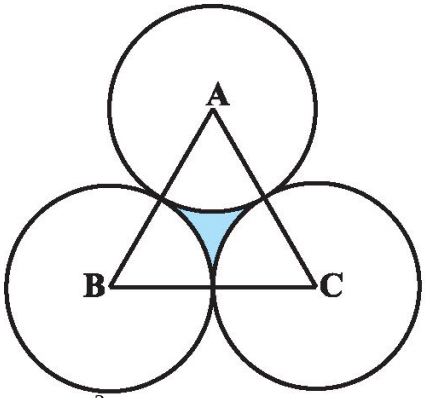




10. Calculate the area of the designed region in the above sided Fig. common between the two quadrants of circles of radius 8 cm each.

11. Find the area of the shaded region in the below Fig., where ABCD is a square of side 14 cm.



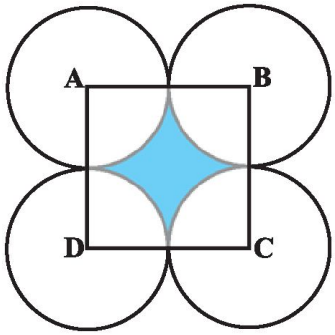


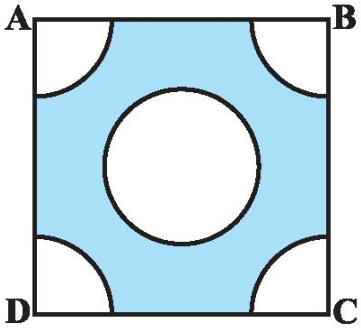
12. The area of an equilateral triangle ABC is 17320.5 cm^2. With each vertex of the triangle as centre, a circle is drawn with radius equal to half the length of the side of the triangle. Find the area of the shaded region. . (Use $\pi = 3.14$ and $\sqrt{3} = 1.73205$)

13. An umbrella has 8 ribs which are equally spaced. Assuming umbrella to be a flat circle of radius 45 cm, find the area between the two consecutive ribs of the umbrella.

14. A horse is tied to a peg at one corner of a square shaped grass field of side 15 m by means of a 5 m long rope. Find (i) the area of that part of the field in which the horse can graze. (ii) the increase in the grazing area if the rope were 10 m long instead of 5 m. . (Use $\pi = 3.14$)

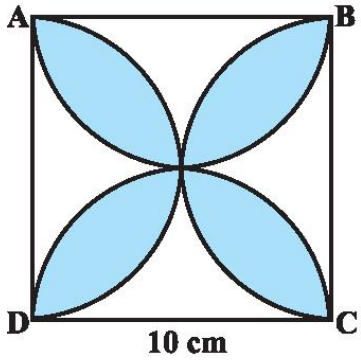
15. In Fig., ABCD is a square of side 14 cm. With centres A, B, C and D, four circles are drawn such that each circle touch externally two of the remaining three circles. Find the area of the shaded region.

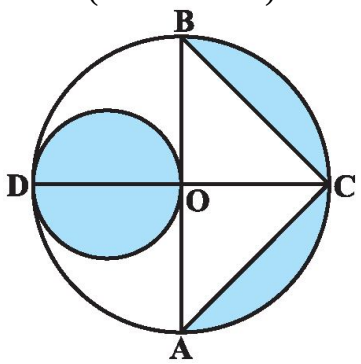




16. From each corner of a square of side 4 cm a quadrant of a circle of radius 1 cm is cut and also a circle of diameter 2 cm is cut as shown in above sided Fig. Find the area of the remaining portion of the square.

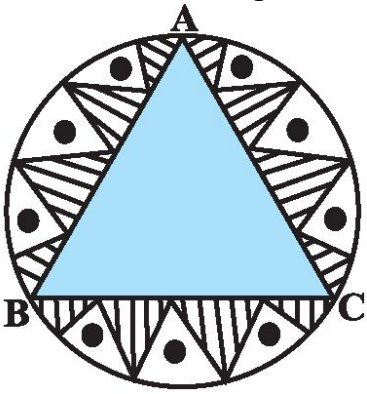
17. Find the area of the shaded design in the below Fig., where ABCD is a square of side 10 cm and semicircles are drawn with each side of the square as diameter. (Use $\pi = 3.14$)

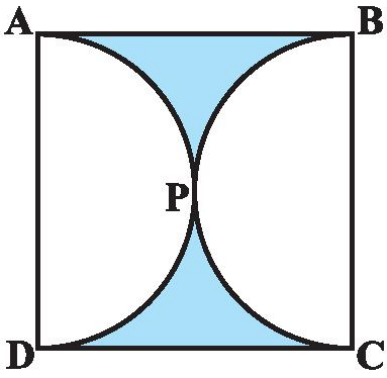




18. In the above sided Fig., AB and CD are two diameters of a circle (with centre O) perpendicular to each other and OD is the diameter of the smaller circle. If OA = 7 cm, find the area of the shaded region.

19. In a circular table cover of radius 32 cm, a design is formed leaving an equilateral triangle ABC in the middle as shown in Fig. Find the area of the design (shaded region).





20. Find the area of the shaded region in above sided Fig., if ABCD is a square of side 14 cm and APD and BPC are semicircles.

SURFACE AREAS AND VOLUMES

1. 16 glass spheres each of radius 2 cm are packed into a cuboidal box of internal dimensions 16 cm × 8 cm × 8 cm and then the box is filled with water. Find the volume of water filled in the box.

2. A bucket is in the form of a frustum of a cone of height 30 cm with radii of its lower and upper ends as 10 cm and 20 cm, respectively. Find the capacity and surface area of the bucket. Also, find the cost of milk which can completely fill the container, at the rate of Rs 25 per litre (use $\pi = 3.14$).

3. A 20 m deep well with diameter 7 m is dug and the earth from digging is evenly spread out to form a platform 22 m by 14 m. Find the height of the platform.

4. A well of diameter 3 m is dug 14 m deep. The earth taken out of it has been spread evenly all around it in the shape of a circular ring of width 4 m to form an embankment. Find the height of the embankment.

5. A toy is in the form of a cone of radius 3.5 cm mounted on a hemisphere of same radius. The total height of the toy is 15.5 cm. Find the total surface area of the toy.

6. Water in a canal, 6 m wide and 1.5 m deep, is flowing with a speed of 10 km/h. How much area will it irrigate in 30 minutes, if 8 cm of standing water is needed?

7. Water is flowing at the rate of 15 km/h through a pipe of diameter 14 cm into a cuboidal pond which is 50 m long and 44 m wide. In what time will the level of water in pond rise by 21 cm?

8. A farmer connects a pipe of internal diameter 20cm from a canal into a cylindrical tank to her field, which is 10m in diameter and 2m deep. If water flows through the pipe at the rate of 3km/hr, in how much time will the tank be filled?

9. A tent is in the shape of a cylinder surmounted by a conical top. If the height and diameter of the cylindrical part are 2.1 m and 4 m respectively, and the slant height of the top is 2.8 m, find the area of the canvas used for making the tent. Also, find the cost of the canvas of the tent at the rate of Rs 500 per m^2

10. A hemispherical tank full of water is emptied by a pipe at the rate of $3\frac{4}{7}$ litres per second. How much time will it take to empty half the tank, if it is 3m in diameter? (Take $\pi = 22/7$)

11. A milk container of height 16 cm is made of metal sheet in the form of a frustum of a cone with radii of its lower and upper ends as 8 cm and 20 cm respectively. Find the cost of milk at the rate of Rs. 22 per litre which the container can hold.

12. A cylindrical bucket of height 32 cm and base radius 18 cm is filled with sand. This bucket is emptied on the ground and a conical heap of sand is formed. If the height of the conical heap is 24 cm, find the radius and slant height of the heap.

13. A metallic right circular cone 20 cm high and whose vertical angle is 60° is cut into two parts at the middle of its height by a plane parallel to its base. If the frustum so obtained be drawn into a wire of diameter 1/16 cm, find the length of the wire.

14. A *gulab jamun,* contains sugar syrup up to about 30% of its volume. Find approximately how much syrup would be found in 45 *gulab jamuns,* each shaped like a cylinder with two hemispherical ends with length 5 cm and diameter 2.8 cm.

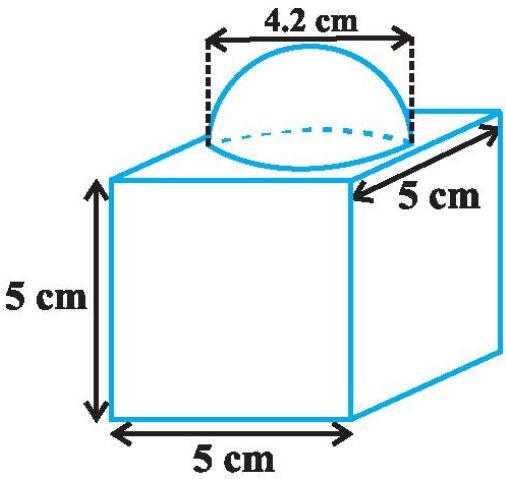
15. A pen stand made of wood is in the shape of a cuboid with four conical depressions to hold pens. The dimensions of the cuboid are 15 cm by 10 cm by 3.5 cm. The radius of each of the depressions is 0.5 cm and the depth is 1.4 cm. Find the volume of wood in the entire stand.

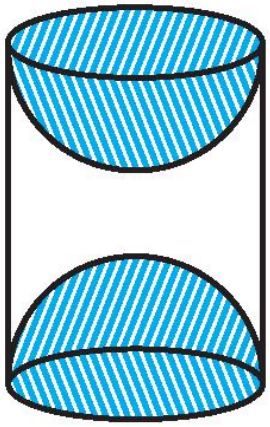
16. From a solid cylinder whose height is 2.4 cm and diameter 1.4 cm, a conical cavity of the same height and same diameter is hollowed out. Find the total surface area of the remaining solid to the nearest cm^2.

17. A metallic right circular cone 20 cm high and whose vertical angle is 60° is cut into two parts at the middle of its height by a plane parallel to its base. If the frustum so obtained be drawn into a wire of diameter $\frac{1}{16}$ cm, find the length of the wire.

18. A right triangle, whose sides are 3 cm and 4 cm (other than hypotenuse) is made to revolve about its hypotenuse. Find the volume and surface area of the double cone so formed.

19. The decorative block shown in Fig. is made of two solids - a cube and a hemisphere. The base of the block is a cube with edge 5 cm, and the hemisphere fixed on the top has a diameter of 4.2 cm. Find the total surface area of the block. (Take $\pi = 22/7$).





20. A wooden article was made by scooping out a hemisphere from each end of a solid cylinder, as shown in above Fig.. 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.

PROBABILITY

1. Two dice are thrown together. Find the probability that the product of the numbers on the top of the dice is (i) 6 (ii) 12 (iii) 7

2. A die is thrown twice. What is the probability that (i) 5 will not come up either time? (ii) 5 will come up at least once?

3. A lot consists of 144 ball pens of which 20 are defective and the others are good. Nuri will buy a pen if it is good, but will not buy if it is defective. The shopkeeper draws one pen at random and gives it to her. What is the probability that (i) She will buy it ? (ii) She will not buy it ?

4. One card is drawn from a well-shuffled deck of 52 cards. Find the probability of getting (i) a king of red colour (ii) a face card (iii) a red face card (iv) the jack of hearts (v) a spade (vi) the queen of diamonds

5. Five cards—the ten, jack, queen, king and ace of diamonds, are well-shuffled with their face downwards. One card is then picked up at random. (i) What is the probability that the card is the

queen? (ii) If the queen is drawn and put aside, what is the probability that the second card picked up is (a) an ace? (b) a queen?

6. 12 defective pens are accidentally mixed with 132 good ones. It is not possible to just look at a pen and tell whether or not it is defective. One pen is taken out at random from this lot. Determine the probability that the pen taken out is a good one.

7. A piggy bank contains hundred 50p coins, fifty Re 1 coins, twenty Rs 2 coins and ten Rs 5 coins. If it is equally likely that one of the coins will fall out when the bank is turned upside down, what is the probability that the coin (i) will be a 50 p coin ? (ii) will not be a Rs 5 coin?

8. A box contains 5 red marbles, 8 white marbles and 4 green marbles. One marble is taken out of the box at random. What is the probability that the marble taken out will be (i) red ? (ii) white ? (iii) not green?

9. (i) A lot of 20 bulbs contain 4 defective ones. One bulb is drawn at random from the lot. What is the probability that this bulb is defective?
(ii) Suppose the bulb drawn in (i) is not defective and is not replaced. Now one bulb is drawn at random from the rest. What is the probability that this bulb is not defective ?

10. A box contains 90 discs which are numbered from 1 to 90. If one disc is drawn at random from the box, find the probability that it bears (i) a two-digit number (ii) a perfect square number (iii) a number divisible by 5.

11. A carton consists of 100 shirts of which 88 are good, 8 have minor defects and 4 have major defects. Jimmy, a trader, will only accept the shirts which are good, but Sujatha, another trader, will only reject the shirts which have major defects. One shirt is drawn at random from the carton. What is the probability that (i) it is acceptable to Jimmy? (ii) it is acceptable to Sujatha?

12. Two customers are visiting a particular shop in the same week (Monday to Saturday). Each is equally likely to visit the shop on any day as on another day. What is the probability that both will visit the shop on (i) the same day? (ii) consecutive days? (iii) different days?

13. A bag contains 5 red balls and some blue balls. If the probability of drawing a blue ball is *double* that of a red ball, determine the number of blue balls in the bag.

14. A box contains 12 balls out of which x are black. If one ball is drawn at random from the box, what is the probability that it will be a black ball? If 6 more black balls are put in the box, the probability of drawing a black ball is now double of what it was before. Find x.

15. A jar contains 24 marbles, some are green and others are blue. If a marble is drawn at random from the jar, the probability that it is green is $\frac{2}{3}$. Find the number of blue marbles in the jar.