

Important Questions(C.B.S.E.)

1.

Write whether $\frac{2\sqrt{45} + 3\sqrt{20}}{2\sqrt{5}}$ on simplification gives an irrational or a rational number.

2.

If $x = a, y = b$ is the solution of the pair of equations $x - y = 2$ and $x + y = 4$, find the values of a and b .

3.

If one root of $5x^2 + 13x + k = 0$ is the reciprocal of the other root, then find value of k .

4.

If $\Delta ABC \sim \Delta QRP$, $\frac{\text{ar}(\Delta ABC)}{\text{ar}(\Delta QRP)} = \frac{9}{4}$, and $BC = 15$ cm, then find PR .


5.

Two cubes have their volumes in the ratio $1 : 27$. Find the ratio of their surface areas.

6.

$A(5, 1); B(1, 5)$ and $C(-3, -1)$ are the vertices of ΔABC . Find the length of median AD .

7.

 X is a point on the side BC of ΔABC . XM and XN are drawn parallel to AB and AC respectively meeting AB in N and AC in M . MN produced meets CB produced at T . Prove that $TX^2 = TB \times TC$

8.

Believe in knowledge . . .

A right circular cylinder and a cone have equal bases and equal heights. If their curved surface areas are in the ratio $8 : 5$, show that the ratio between radius of their bases to their height is $3 : 4$.

9.

In an A.P if sum of its first n terms is $3n^2 + 5n$ and its k^{th} term is 164 , find the value of k .

10.

If coordinates of two adjacent vertices of a parallelogram are $(3, 2), (1, 0)$ and diagonals bisect each other at $(2, -5)$, find coordinates of the other two vertices.

11.

If the area of triangle with vertices $(x, 3), (4, 4)$ and $(3, 5)$ is 4 square units, find x .

12.

In fig. (2) AB is a chord of length 8 cm of a circle of radius 5 cm. The tangents to the circle at A and B intersect at P . Find the length of AP .

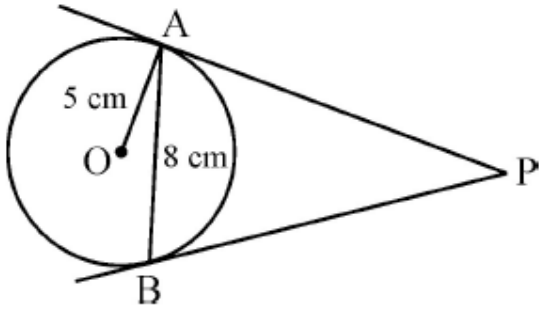


Fig. (2)

13.

Evaluate

$$\frac{\cos 58^\circ}{\sin 32^\circ} + \frac{\sin 22^\circ}{\cos 68^\circ} - \frac{\cos 38^\circ \operatorname{cosec} 52^\circ}{\sqrt{3} (\tan 18^\circ \tan 35^\circ \tan 60^\circ \tan 72^\circ \tan 55^\circ)}$$

14.

The short and long hands of a clock are 4 cm and 6 cm long respectively. Find the sum of distances travelled by their tips in 48 hours.

15.

The side of a square is 10 cm. Find the area between inscribed and circumscribed circles of the square.

16.

For what values of m and n the following system of linear equations has infinitely many solutions.

$$3x + 4y = 12$$

$$(m + n)x + 2(m - n)y = 5m - 1$$

17.

A faster train takes one hour less than a slower train for a journey of 200 km. If the speed of slower train is 10 km/hr less than that of faster train, find the speeds of two trains.

18.

The angle of elevation of the top of a hill at the foot of a tower is 60° and the angle of depression from the top of tower to the foot of hill is 30° . If tower is 50 metre high, find the height of the hill.

19.

A man donates 10 aluminum buckets to an orphanage. A bucket made of aluminum is of height 20 cm and has its upper and lowest ends of radius 36 cm and 21 cm respectively. Find the cost of preparing 10 buckets if the cost of aluminum sheet is ₹ 42 per 100 cm^2 . Write your comments on the act of the man.

20.

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

21.

Two pipes together can fill a tank in 12 hours. If first pipe can fill the tank 10 hours faster than the second, then how many hours will the second pipe take to fill the tank ?

22.

Find the common difference of an A.P. whose first term is 5 and the sum of its first four terms is half the sum of its next four terms.

23.

Show that $n(m^2 - 1) = 2m$, if $m = \sin \theta + \cos \theta$ and $n = \sec \theta + \operatorname{cosec} \theta$.

24.

On a horizontal plane there is a vertical tower with a flag pole on the top of the tower. From a point 9 m away from the foot of the tower, the angles of elevation of the top and foot of the flag pole are 60° and 30° respectively. Find the heights of the tower and the flag pole mounted on it.

25.

A milkman uses a container, in the shape of frustum of a cone, to store milk. The container open from the top, is of height 40 cm with radii of its lower and upper circular ends as 14 cm and 35 cm respectively. Find the volume of milk (in litres) which can completely fill the container. If he sells the milk at ₹ 35 per litre, for how much amount he can sell the whole milk ?

He had a desire to give one-tenth of the whole milk free to the children of economically weaker section of society.

What value is reflected by his desire ? $\left(\text{Use } \pi = \frac{22}{7} \right)$

26.

The mean of the following frequency distribution is 62.8 and the sum of all frequencies is 50. Find the missing frequencies f_1 and f_2 .

Classes	0 – 20	20 – 40	40 – 60	60 – 80	80 – 100	100 – 120
Frequencies	5	f_1	10	f_2	7	8

27.

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

28.

What is the HCF of smallest prime number and the smallest composite number ?

29.

Given $\Delta ABC \sim \Delta PQR$, if $\frac{AB}{PQ} = \frac{1}{3}$, then find $\frac{\text{ar } \Delta ABC}{\text{ar } \Delta PQR}$.

30.

In Fig. 1, ABCD is a rectangle. Find the values of x and y .

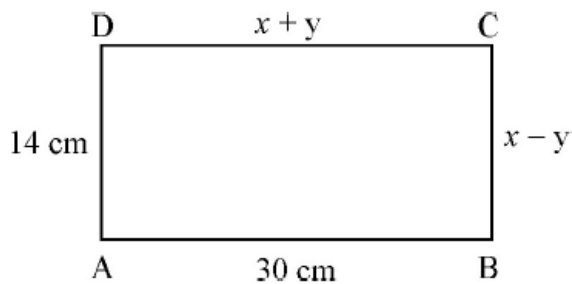


Fig. – 1

31.

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

32.

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.

33.

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

34.

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 100 km/h from the usual speed. Find its usual speed.

35.

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

36.

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 6 km/hr more than its original speed. If it takes 3 hours to complete total journey, what is the original average speed ?

37.

The sum of four consecutive 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 terms is 7 : 15. Find the numbers.

38.

Write the m^{th} term of the A.P. $\frac{1}{k}, \frac{1+k}{k}, \frac{1+2k}{k}, \dots$

39.

If $\sin \theta + \cos \theta = \sqrt{2} \cos (90^\circ - \theta)$, find the value of $\cot \theta$.

40.

The line segment joining the points A(2, 1) and B(5, -8) is trisected at the points P and Q, where P is nearer to A. If P lies on the line $2x - y + k = 0$, find the value of k.

41.

The x -coordinate of a point P is twice its y -coordinate. If P is equidistant from the points Q(2, -5) and R(-3, 6), find the coordinates of P.

42.

Prove that : $\frac{1}{\operatorname{cosec} \theta + \cot \theta} - \frac{1}{\sin \theta} = \frac{1}{\sin \theta} - \frac{1}{\operatorname{cosec} \theta - \cot \theta}$

43.

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

44.

A sphere of diameter 12 cm is dropped in a right circular cylindrical vessel, partly filled with water. If the sphere is completely submerged in water, the water level in the vessel rises by $3\frac{5}{9}$ cm. Find the diameter of the cylindrical vessel.

45.

A cylinder whose height is two-third of its diameter, has the same volume as that of a sphere of radius 4 cm. Find the radius of base of the cylinder.

46.

Two taps together can fill a tank in 6 hours. The tap of larger diameter takes 9 hours less than the smaller one to fill the tank separately. Find the time in which each tap can fill the tank separately.

47.

The 4th and the last terms of an A.P. are 11 and 89 respectively. If there are 30 terms in the A.P., find the A.P. and its 23rd term.

48.

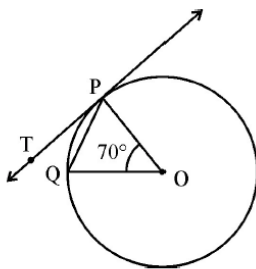
Prove that : $\left(\frac{\sin A}{1 - \cos A} - \frac{1 - \cos A}{\sin A} \right) \cdot \left(\frac{\cos A}{1 - \sin A} - \frac{1 - \sin A}{\cos A} \right) = 4$.

49.

The shadow of a 30 m high tower on the ground at some time of the day is $10\sqrt{3}$ m long. Find the angle of elevation of the sun at that time.

50.

In Fig. 1, O is the centre of the circle, PQ is a chord and PT is tangent to the circle at P. If $\angle POQ = 70^\circ$, find $\angle TPQ$.



(Fig. - 1)

51.

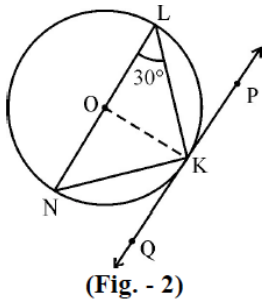
If three different coins are tossed together, then find the probability of getting two heads.

52.

Find the value of k for which the roots of the quadratic equation $2x^2 + kx + 8 = 0$ will have equal value.

53.

In Fig. 2, O is the centre of the circle and LN is a diameter. If PQ is a tangent to the circle at K and $\angle KLN = 30^\circ$, find $\angle PKL$.

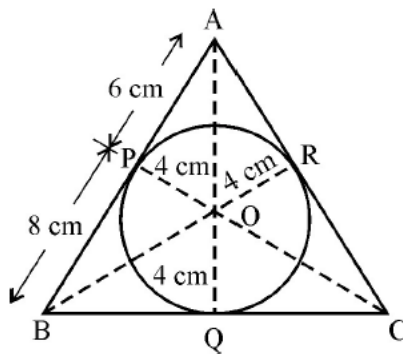


54.

If the point (x, y) is equidistant from the points $(a + b, b - a)$ and $(a - b, a + b)$, prove that $bx = ay$.

55.

In Fig. 3, the radius of incircle of $\triangle ABC$ of area 84 cm^2 is 4 cm and the lengths of the segments AP and BP into which side AB is divided by the point of contact P are 6 cm and 8 cm . Find the lengths of the sides AC and BC .



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56.

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From a solid cylinder whose height is 8 cm and radius 6 cm , a conical cavity of same height and same base radius is hollowed out. Find the total surface area of the remaining solid. (Take $\pi = 3.14$)

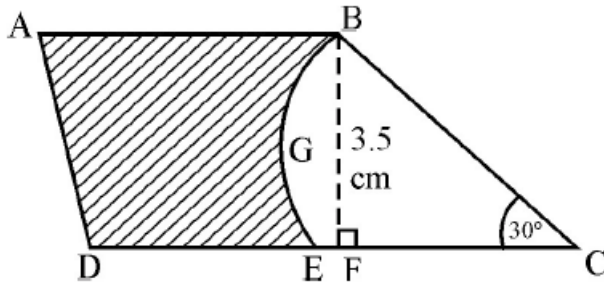
57.

A wire when bent in the form of an equilateral triangle encloses an area of $121\sqrt{3} \text{ cm}^2$.

If the wire is bent in the form of a circle, find the area enclosed by the circle (use $\pi = \frac{22}{7}$).

58.

In Fig. 4, $ABCD$ is a trapezium with $AB \parallel DC$ and $\angle BCD = 30^\circ$. If $BGEC$ is a sector of a circle with centre C and $AB = BC = 7 \text{ cm}$, $DE = 4 \text{ cm}$ and $BF = 3.5 \text{ cm}$, then find the area of the shaded region (use $\pi = \frac{22}{7}$).



59.

Solve for x : $\sqrt{2} x^2 + 7x + 5\sqrt{2} = 0$

60.

A and B working together can do a work in 6 days. If A takes 5 days less than B to finish the work, in how many days B alone can do the work ?

61.

From a point P on the ground, the angles of elevation of the top of a 10 m tall building and a helicopter, hovering at some height vertically over the top the building are 30° and 60° respectively. Find the height of the helicopter above the ground.

62.

From a pack of 52 playing cards, Jacks and Kings of red colour and Queens and Aces of black colour are removed. The remaining cards are mixed and a card is drawn at random. Find the probability that the drawn card is

- (i) a black Queen
- (ii) a card of red colour
- (iii) a Jack of black colour
- (iv) a face card

63.

If the coordinates of two points are A(3, 4), B(5, -2), and a point P (x, 5) is such that PA = PB then find the area of Δ PAB.

64.

A solid metallic cylinder of diameter 12 cm and height 15 cm is melted and recast into toys each in the shape of a cone of radius 3 cm and height 9 cm. Find the number of toys so formed.

65.

A bucket, is in the form of frustum of a cone whose height is 42 cm and the radii of its circular ends are 30 cm and 10 cm. Find the amount of milk (in litres) which this bucket can hold. If the milkman sells the milk at the rate of ₹ 40 per litre, what amount he will get from the sale ?

If the milkman sells half the milk at less rate to the economically weaker section of society, what value he exhibits by doing this ?

66.

An observer, 1.5 m tall, is 28.5 m away from a 30 m high tower. Determine the angle of elevation of the top of the tower from the eye of the observer.

67.

Write the n^{th} term of the A.P. $\frac{1}{m}, \frac{1+m}{m}, \frac{1+2m}{m}, \dots$

68.

In fig. 1, there are two concentric circles with centre O. PRT and PQS are tangents to the inner circle from a point P lying on the outer circle. If PR = 5 cm, find the length of PS.

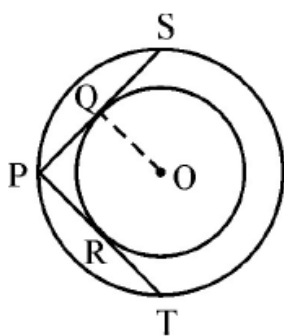


Fig. - 1

69.

Solve for x :

$$\frac{x+3}{x+2} = \frac{3x-7}{2x-3}, x \neq -2, \frac{3}{2}$$

70.

Find the value of k for which the points $(-5, 1)$, $(1, k)$ and $(4, -2)$ are collinear.

71.

In fig. 3, PQ is a tangent from an external point P to a circle with centre O and OP cuts the circle at T and QOR is a diameter. If $\angle POR = 130^\circ$ and S is a point on the circle, find $\angle 1 + \angle 2$.

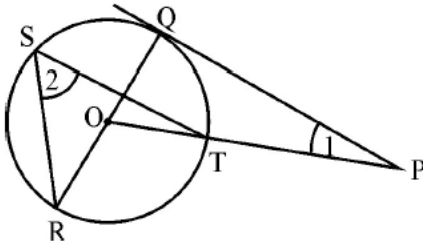


Fig. – 3

72.

From the top of a 120 m high tower, a man observes two cars on the opposite sides of the tower and in straight line with the base of tower with angles of depression as 60° and 45° . Find the distance between the two cars. (Take $\sqrt{3} = 1.732$)

73.

A circus tent is in the shape of a cylinder surmounted by a conical top of same diameter. If their common diameter is 56 cm, the height of cylindrical part is 6 m and the total height of the tent above the ground is 27 m, find the area of canvas used in making the tent.

74.

The difference between the radii of the smaller circle and the larger circle is 7 cm and the difference between the areas of the two circles is 1078 sq.cm. Find the radius of the smaller circle.

75.

Find the coordinates of a point on the x -axis which is equidistant from the points $A(2, -5)$ and $B(-2, 9)$.

76.

A game consists of tossing a one-rupee coin 3 times and noting the outcome each time. Ramesh wins the game if all the tosses give the same result (i.e. three heads or three tails) and loses otherwise. Find the probability of Ramesh losing the game.

77.

Water is flowing at the rate of 5 km/hour through a pipe of diameter 14 cm into a rectangular tank of dimensions $50\text{ m} \times 44\text{ m}$. Find the time in which the level of water in the tank will rise by 7 cm.

78.

Show that if the roots of the following quadratic equation are equal, then $ad = bc$

$$x^2(a^2 + b^2) + 2(ac + bd)x + (c^2 + d^2) = 0$$

79.

If the ratio of the 11th term of an AP to its 18th term is $2 : 3$, find the ratio of the sum of the first five terms to the sum of its first 10 terms.

80.

Find the area of the circle that can be inscribed in a square of side 6 cm.

81.

Find the diameter of the semi-circular protractor if its perimeter is 36 cm.

82.

Find the value of ab if the roots of equation $ax^2 + x + b = 0$ are equal.

83.

One card is drawn at random from a well shuffled pack of cards. Find the probability of getting (i) a king of red colour (ii) a face card.

84.

In fig. (1) PA and PB are tangents from point P. AB is chord of the circle and O is centre of the circle. If $\angle OBA = 10^\circ$, find $\angle BPA$.

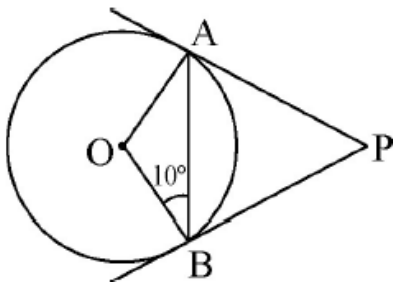


Fig.-1

85.

Two concentric circles are of radii 5 cm and 3 cm. Find the length of chord of the larger circle which touches the smaller circle.

86.

Find the ratio of volumes of a cube to that of a sphere which will exactly fit inside the cube.

87.

Find the roots of quadratic equation $\sqrt{3}x^2 - 2\sqrt{2}x - 2\sqrt{3} = 0$.

88.

In fig. (2) two circles with centres A and B touch each other externally at K. Find the length of segment PQ.

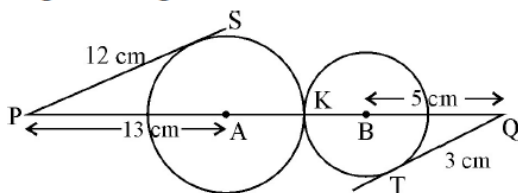


Fig.-2

89.

If the shadow of a tower 30 m long, when the Sun's elevation is 30° . What is the length of the shadow, when Sun's elevation is 60° ?

90.

The angles of depression of two ships from the top of a light house and on the same side of it are found to be 45° and 30° . If the ships are 200 m apart, find the height of the light house. (use $\sqrt{3} = 1.73$)

91.

All kings, queens and jacks are removed from a pack of 52 cards. The remaining cards are well shuffled and a card is drawn from it at random. Find the probability that the drawn card is (i) a black face card (ii) a red card (iii) an ace.

92.

A bag contains 14 balls of which x are white. If 6 more white balls are added to the bag, the probability of drawing a white ball is $\frac{1}{2}$. Find the value of x .

93.

A solid cuboid of iron of dimension $66 \text{ cm} \times 20 \text{ cm} \times 27 \text{ cm}$ is used to cast an iron pipe. The outer diameter of the pipe is 10 cm and thickness is 1 cm. Find the length of the pipe.

94.

In figure (5) a circle of radius 7 cm is inscribed in a square. Find the area of shaded region. (use $\pi = 3.14$)

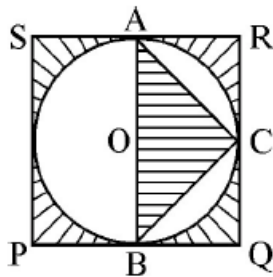


Fig.-5

95.

Believe in knowledge . . .

A box contains cards marked by number from 5 to 104. A card is drawn at random. Find the probability that the drawn card bears.

- (i) A two digits prime number greater than 79.
- (ii) A number which leaves remainder 1 when divided by 6
- (iii) A composite number less than 43

96.

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

97.

One year ago, a man 8 times as old his son. Now his age is equal to the square of his son's age. Find their present ages.

98.

Find the sum of all two-digit numbers which when divided by 3 leaves 1 as remainder.

99.

Find the value of k , for which one root of the quadratic equation $kx^2 - 14x + 8 = 0$ is six times the other.

100.

Find the value of a , for which point $P\left(\frac{a}{3}, 2\right)$ is the midpoint of the line segment joining the points $Q(-5, 4)$ and $R(-1, 0)$.

101.

If 2 is a root of the equation $x^2 + kx + 12 = 0$ and the equation $x^2 + kx + q = 0$ has equal roots, find the value of q .

102.

How many two digit numbers are divisible by 7?

103.

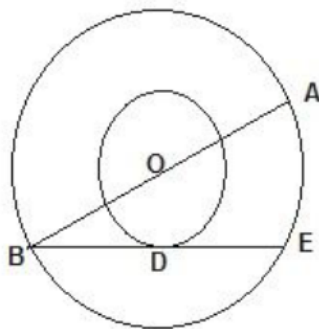
A sphere of diameter 6 cm is dropped in a right circular cylindrical vessel partly filled with water. The diameter of the cylindrical vessel is 12 cm. If the sphere is completely submerged in water, by how much will the level of water rise in the cylindrical vessel?

104.

Find the number of coins of 1.5 cm diameter and 0.2 cm thickness to be melted to form a right circular cylinder of height 10 cm and diameter 4.5 cm.

105.

In the given figure, the radii of two concentric circles are 13 cm and 8 cm. AB is diameter of the bigger circle. BD is the tangent to the smaller circle touching it at D . Find the length AD .



106.

P & Q are centres of circles of radii 9 cm and 2 cm respectively. $PQ = 17$ cm. R is the centre of the circle of radius x cm which touches the above circle externally. Given that angle PRQ is 90° . Write an equation in x and solve it.

107.

One card is drawn from a well shuffled deck of 52 cards. Find the probability of getting (a) Non face card, (b) Black king or a Red queen, (c) Spade card.

108.

Water is flowing at the rate of 0.7 m/sec through a circular pipe whose internal diameter is 2 cm into a cylindrical tank, the radius of whose base is 40 cm. Determine the increase in the level of water in half hour.

109.

The perimeters of the ends of the frustum of a cone are 207.24 cm and 169.56 cm. If the height of the frustum be 8 cm, find the whole surface area of the frustum. (Use $\pi = 3.14$)

110.

Three eighth of the students of a class opted for visiting an old age home. Sixteen students opted for having a nature walk. Square root of total number of students in the class opted for tree plantation in the school. The number of students who visited an old age home is same as the number of students who went for a nature walk and did tree plantation. Find the total number of student. What values are inculcated in students through such activities?

111.

The minimum age of children to be eligible to participate in a painting competition is 8 years. It is observed that the age of youngest boy was 8 years and the ages of rest of participants are having a common difference of 4 months. If the sum of ages of all the participants is 168 years, find the age of eldest participant in the painting competition.

112.

If $P(9a-2, -b)$ divides the line segment joining $A(3a+1, -3)$ and $B(8a, 5)$ in the ratio 3:1. Find the values of a & b .

113.

Four equal circles are described at the four corners of a square so that each touches two of the others. The shaded area enclosed between the circles is $\frac{24}{7}\text{cm}^2$. Find the radius of each circle.

114.

A right triangle having sides 15 cm and 20 cm is made to revolve about its hypotenuse. Find the Volume and Surface Area of the double cone so formed. (Use $\pi = 3.14$).

115.

A letter is chosen at random from the letter of the "word PROBABILITY". Find the probability that it is a not a vowel.

116.

The sum of first six terms of an A.P. is 42. The ratio of its 10th term to its 30th term is 1:3. Find the first term of the A.P.

117.

Find the area of the minor segment of a circle of radius 42cm, if the length of the corresponding arc is 44 cm.

118.

A cylindrical pipe has inner diameter of 4 cm and water flows through it at the rate of 20 meter per minute. How long would it take to fill a conical tank of radius 40 cm and depth 72cm?

119.

Find the number of spherical lead shots , each of diameter 6 cm that can be made from a solid cuboid of lead having dimensions 24 cm \times 22 cm \times 12 cm.

120.

A wooden souvenir is made by scooping out a hemisphere from each end of a solid cylinder. If the height of the cylinder is 10 cm and its base is of radius 3.5 cm then find the total cost of polishing the souvenir at the rate of Rs. 10 per cm^2 .

121.

Cards marked with numbers 1, 3, 5... 49 are placed in a box and mixed thoroughly. One card is drawn from the box. Find the probability that the number on the card is

- (i) divisible by 3
- (ii) a composite number
- (iii) Not a perfect square
- (iv) Multiple of 3 and 5.

122.

The points A (1 , -2) , B (2 , 3) , C (k , 2) and D (- 4 , - 3) are the vertices of a parallelogram. Find the value of k and the altitude of the parallelogram corresponding to the base AB.

123.

From a point 100 m above a lake the angle of elevation of a stationary helicopter is 30° and the angle of depression of reflection of the helicopter in the lake is 60° . Find the height of the helicopter above the lake.

124.

A donor agency ensures milk is supplied in containers, which are in the form of a frustum of a cone to be distributed to flood victims in a camp. The height of each frustum is 30 cm and the radii of whose lower and upper circular ends are 20 cm and 40 cm respectively. . If this milk is available at the rate of Rs.35 per litre and 880 litres of milk is needed daily for a camp.

- (a) Find how many milk containers are needed daily for the camp.
 (b) What daily cost will it put on the donor agency?
 (c) What value of the donor agency is depicted in this situation?

125.

50 circular discs, each of radius 7cm and thickness 0.5cm are placed one above the other. Find the total surface area of the solid so formed. Find how much space will be left in a cubical box of side 25cm if the solid formed is placed inside it.

126.

If $\sin\theta = \cos\theta$, then find the value of $2\tan\theta + \cos^2\theta$

127.

After how many decimal places will the decimal expansion of $\frac{23}{2^4 \times 5^3}$ terminate?

128.

If 7 times the 7th term of an A.P is equal to 11 times its 11th term, then find its 18th term.

129.

A card is drawn at random from a well shuffled deck of 52 cards. Find the probability of getting neither a red card nor a queen.

130.

Two dice are thrown at the same time and the product of numbers appearing on them is noted. Find the probability that the product is a prime number

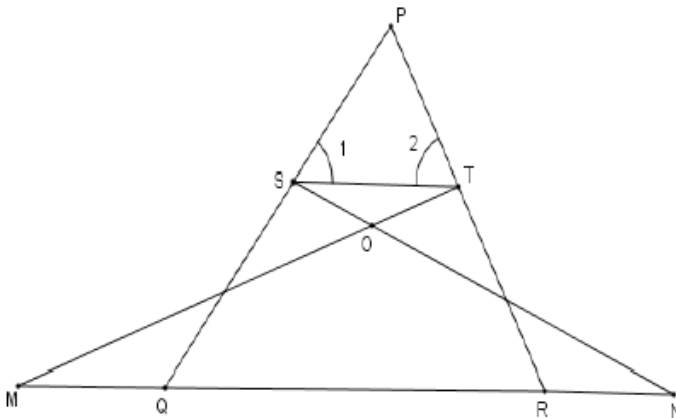
131.

Believe in knowledge . . .

Prove that $\sin\theta(1 + \tan\theta) + \cos\theta(1 + \cot\theta) = \sec\theta + \operatorname{cosec}\theta$

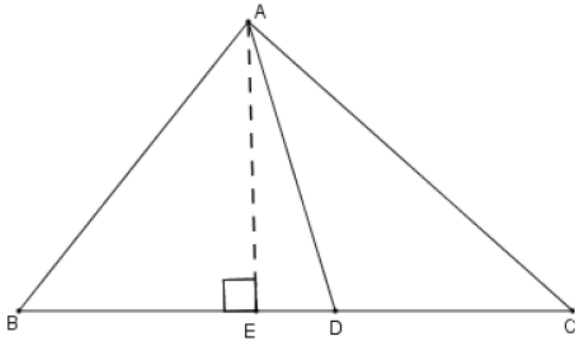
132.

In figure $\angle 1 = \angle 2$ and $\Delta NSQ \cong \Delta MTR$, then prove that $\Delta PTS \sim \Delta PRQ$.



133.

In ΔABC , if AD is the median, then show that $AB^2 + AC^2 = 2(AD^2 + BD^2)$



134.

Water is flowing at the rate of 15 km per hour through a pipe of diameter 14cm into a rectangular tank which is 50 m long and 44 m wide. Find the time in which the level of water in the tank will rise by 21 cm.

135.

A solid sphere of radius 3 cm is melted and then recast into small spherical balls each of diameter 0.6cm. Find the number of balls.

136.

The angle of elevation of a cloud from a point 60 m above the surface of the water of a lake is 30° and the angle of depression of its shadow from the same point in water of lake is 60° . Find the height of the cloud from the surface of water.

137.

If $\sec\theta + \tan\theta = p$, then find the value of $\operatorname{cosec}\theta$.

138.

In fig.1, PQ is a tangent at a point C to a circle with centre O. If AB is a diameter and $\angle CAB = 30^\circ$, find $\angle PCA$.

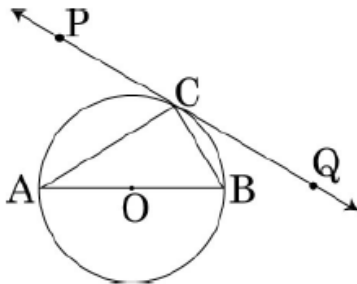


Figure 1

139.

For what value of k will $k+9$, $2k-1$ and $2k+7$ are the consecutive terms of an A.P. ?

140.

A card is drawn at random from a well shuffled pack of 52 playing cards. Find the probability of getting neither a red card nor a queen.

141.

Prove that the points $(3, 0)$, $(6, 4)$ and $(-1, 3)$ are the vertices of a right angled isosceles triangle.

142.

The 4th term of an A.P. is zero. Prove that the 25th term of the A.P. is three times its 11th term.

143.

In Fig. 3, from an external point P, two tangents PT and PS are drawn to a circle with centre O and radius r. If $OP = 2r$, show that $\angle OTS = \angle OST = 30^\circ$.

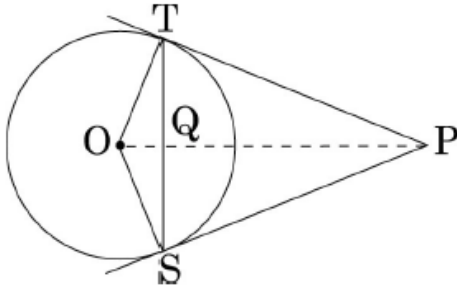


Figure 3

144.

In fig. 6, find the area of the shaded region, enclosed between two concentric circles of radii 7 cm and 14 cm where $\angle AOC = 40^\circ$. (Use $\pi = \frac{22}{7}$)

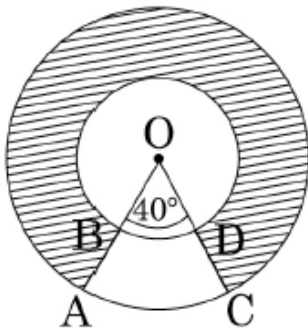


Figure 6

145.

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 mth terms.

146.

$$\text{Solve for } x : \frac{1}{(x-1)(x-2)} + \frac{1}{(x-2)(x-3)} = \frac{2}{3}, \quad x \neq 1, 2, 3$$

147.

A conical vessel, with base radius 5 cm and height 24 cm, is full of water. This water is emptied into a cylindrical vessel of base radius 10 cm. Find the height to which the water will rise in the cylindrical vessel. (Use $\pi = \frac{22}{7}$)

148.

A sphere of diameter 12 cm, is dropped in a right circular cylindrical vessel, partly filled with water. If the sphere is completely submerged in water, the water level in the cylindrical vessel rises by $3\frac{5}{9}$ cm. Find the diameter of the cylindrical vessel.

149.

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

150.

Three different coins are tossed together. Find the probability of getting (i) exactly two heads (ii) at least two heads (iii) at least two tails.

151.

In Fig. 7, 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 $\frac{DO'}{CO}$.

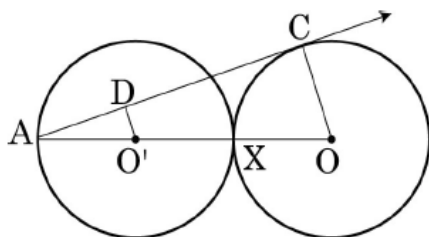


figure 7

152.

The angle of elevation of the top Q of a vertical tower PQ from a point X on the ground is 60° . From a point Y, 40 m vertically above X, the angle of elevation of the top Q of tower is 45° . Find the height of the tower PQ and the distance PX. (Use $\sqrt{3} = 1.73$)

153.

The houses in a row are 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.

154.

In fig. 8, 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 $\frac{AD}{AB} = \frac{AE}{AC} = \frac{1}{3}$. Calculate the area of ΔADE and compare it with area of ΔABC .

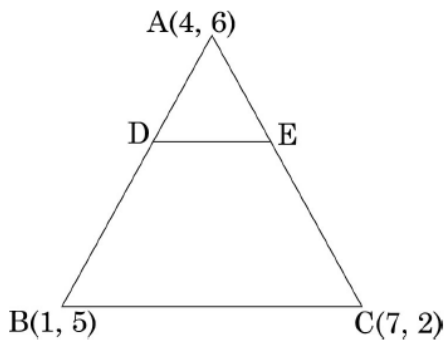


Figure 8

155.

A number x is selected at random from the numbers 1, 2, 3 and 4. Another number y is selected at random from the numbers 1, 4, 9 and 16. Find the probability that product of x and y is less than 16.

156.

In Fig. 9, is shown a sector OAP of a circle with centre O, containing $\angle \theta$. AB is perpendicular to the radius OA and meets OP produced at B. Prove that

the perimeter of shaded region is $r \left[\tan\theta + \sec\theta + \frac{\pi\theta}{180} - 1 \right]$

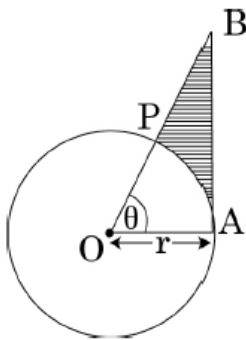


Figure 9

157.

Cards marked with number 3, 4, 5,, 50 are placed in a box and mixed thoroughly. A card is drawn at random from the box. Find the probability that the selected card bears a perfect square number.

158.

If $x = \frac{2}{3}$ and $x = -3$ are roots of the quadratic equation $ax^2 + 7x + b = 0$, find the values of a and b .

159.

Find the ratio in which y -axis divides the line segment joining the points $A(5, -6)$ and $B(-1, -4)$. Also find the coordinates of the point of division.

160.

In Fig. 2, a circle is inscribed in a ΔABC , such that it touches the sides AB , BC and CA at points D , E and F respectively. If the lengths of sides AB , BC and CA are 12 cm, 8 cm and 10 cm respectively, find the lengths of AD , BE and CF .

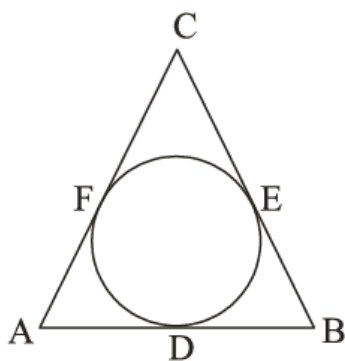


Fig. 2



161.

The x -coordinate of a point P is twice its y -coordinate. If P is equidistant from $Q(2, -5)$ and $R(-3, 6)$, find the coordinates of P .

162.

How many terms of the A.P. 18, 16, 14, be taken so that their sum is zero?

163.

In Fig. 3, AP and BP are tangents to a circle with centre O , such that $AP = 5$ cm and $\angle APB = 60^\circ$. Find the length of chord AB .

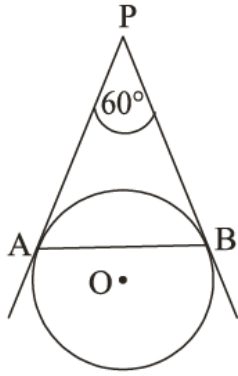


Fig. 3

164.

In Fig. 6, ABC is a triangle coordinates of whose vertex A are (0, -1). D and E respectively are the mid-points of the sides AB and AC and their coordinates are (1, 0) and (0, 1) respectively. If F is the mid-point of BC, find the areas of ΔABC and ΔDEF .

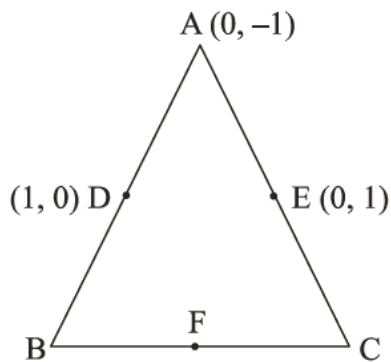


Fig. 6

165.

In Fig. 7, are shown two arcs PAQ and PBQ. Arc PAQ is a part of circle with centre O and radius OP while arc PBQ is a semi-circle drawn on PQ as diameter with centre M. If $OP = PQ = 10$ cm show that area of shaded region is

$$25 \left(\sqrt{3} - \frac{\pi}{6} \right) \text{cm}^2.$$

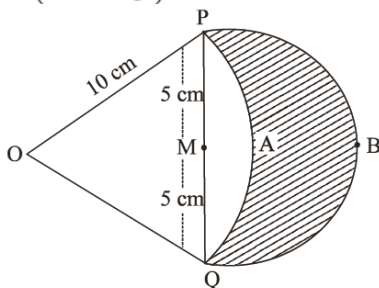


Fig. 7

166.

Solve for x :

$$\frac{2x}{x-3} + \frac{1}{2x+3} + \frac{3x+9}{(x-3)(2x+3)} = 0, \quad x \neq 3, -3/2$$

167.

A well of diameter 4 m is dug 21 m deep. The earth taken out of it has been spread evenly all around it in the shape of a circular ring of width 3 m to form an embankment. Find the height of the embankment.

168.

The sum of the radius of base and height of a solid right circular cylinder is 37 cm. If the total surface area of the solid cylinder is 1628 sq. cm, find the

volume of the cylinder. $\left(\text{use } \pi = \frac{22}{7} \right)$

169.

In a single throw of a pair of different dice, what is the probability of getting (i) a prime number on each dice ? (ii) a total of 9 or 11 ?

170.

A passenger, while boarding the plane, slipped from the stairs and got hurt. The pilot took the passenger in the emergency clinic at the airport for treatment. Due to this, the plane got delayed by half an hour. To reach the destination 1500 km away in time, so that the passengers could catch the connecting flight, the speed of the plane was increased by 250 km/hour than the usual speed. Find the usual speed of the plane.

What value is depicted in this question?

171.

In Fig. 8, O is the centre of a circle of radius 5 cm. T is a point such that $OT = 13$ cm and OT intersects circle at E. If AB is a tangent to the circle at E, find the length of AB, where TP and TQ are two tangents to the circle.

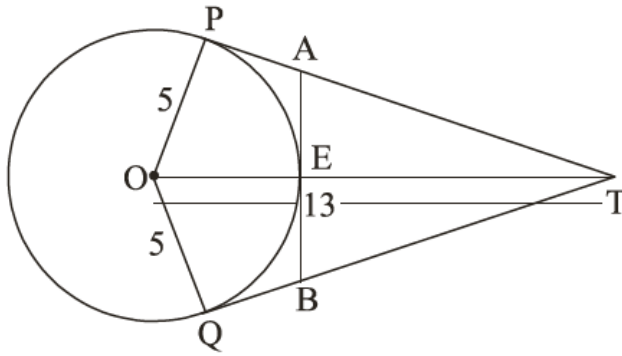


Fig. 8

172.

Find x in terms of a , b and c :

$$\frac{a}{x-a} + \frac{b}{x-b} = \frac{2c}{x-c}, \quad x \neq a, b, c$$

173.

A bird is sitting on the top of a 80 m high tree. From a point on the ground, the angle of elevation of the bird is 45° . The bird flies away horizontally in such a way that it remained at a constant height from the ground. After 2 seconds, the angle of elevation of the bird from the same point is 30° . Find the speed of flying of the bird. (Take $\sqrt{3} = 1.732$)

174.

A thief runs with a uniform speed of 100 m/minute. After one minute a policeman runs after the thief to catch him. He goes with a speed of 100 m/minute in the first minute and increases his speed by 10 m/minute every succeeding minute. After how many minutes the policeman will catch the thief.

175.

Prove that the area of a triangle with vertices $(t, t-2)$, $(t+2, t+2)$ and $(t+3, t)$ is independent of t .

176.

An elastic belt is placed around the rim of a pulley of radius 5 cm. (Fig. 10) From one point C on the belt, the elastic belt is pulled directly away from the centre O of the pulley until it is at P, 10 cm from the point O. Find the length of the belt that is still in contact with the pulley. Also find the shaded area.

(use $\pi = 3.14$ and $\sqrt{3} = 1.73$)

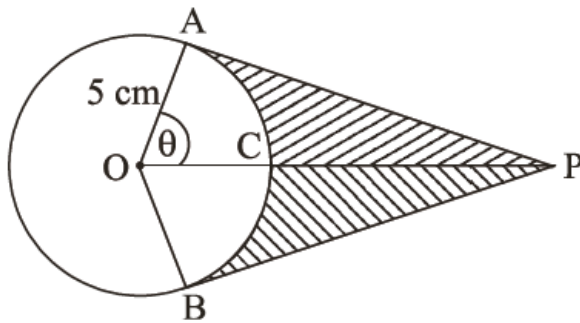


Fig. 10

177.

A bucket open at the top is in the form of a frustum of a cone with a capacity of 12308.8 cm^3 . The radii of the top and bottom circular ends are 20 cm and 12 cm respectively. Find the height of the bucket and the area of metal sheet used in making the bucket. (use $\pi = 3.14$)

178.

20 tickets, on which numbers 1 to 20 are written, are mixed thoroughly and then a ticket is drawn at random out of them. Find the probability that the number on the drawn ticket is a multiple of 3 or 7.

179.

A two digit number is four times the sum of the digits. It is also equal to 3 times the product of digits. Find the number.

180.

Find the ratio in which the point $(-3, k)$ divides the line-segment joining the points $(-5, -4)$ and $(-2, 3)$. Also find the value of k .

181.

In Fig. 2, from a point P, two tangents PT and PS are drawn to a circle with centre O such that $\angle SPT = 120^\circ$, Prove that $OP = 2PS$.

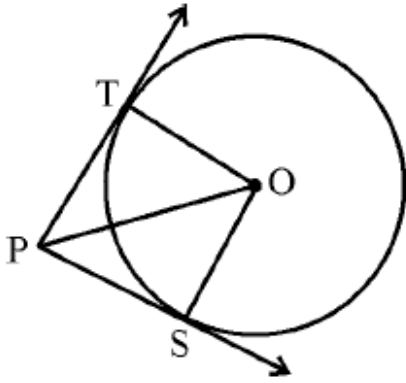


Fig. 2

182.

If the ratio of sum of the first m and n terms of an A.P. is $m^2 : n^2$, show that the ratio of its m^{th} and n^{th} terms is $(2m - 1) : (2n - 1)$.

183.

In fig. 3 are two concentric circles of radii 6 cm and 4 cm with centre O. If AP is a tangent to the larger circle and BP to the smaller circle and length of AP is 8 cm, find the length of BP.

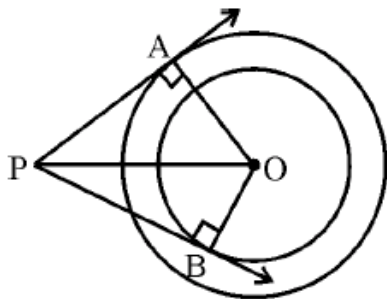


Fig. 3

184.

Find the area of shaded region in Fig. 4, where a circle of radius 6 cm has been drawn with vertex O of an equilateral triangle OAB of side 12 cm. (Use $\pi = 3.14$ and $\sqrt{3} = 1.73$)

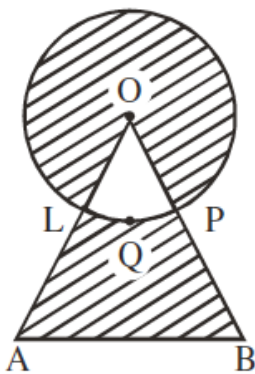


Fig. 4

185.

If the point C $(-1, 2)$ divides internally the line-segment joining the points A $(2, 5)$ and B (x, y) in the ratio $3 : 4$, find the value of $x^2 + y^2$.

186.

Divide 56 in four parts in A.P. such that the ratio of the product of their extremes (1^{st} and 4^{th}) to the product of means (2^{nd} and 3^{rd}) is $5 : 6$.

187.

Solve the given quadratic equation for x : $9x^2 - 9(a + b)x + (2a^2 + 5ab + 2b^2) = 0$.

188.

A cylindrical tub, whose diameter is 12 cm and height 15 cm is full of ice-cream. The whole ice-cream is to be divided into 10 children in equal ice-cream cones, with conical base surmounted by hemispherical top. If the height of conical portion is twice the diameter of base, find the diameter of conical part of ice-cream cone.

189.

The co-ordinates of the points A, B and C are $(6, 3)$, $(-3, 5)$ and $(4, -2)$ respectively.

P (x, y) is any point in the plane. Show that $\frac{\text{ar}(\Delta PBC)}{\text{ar}(\Delta ABC)} = \left| \frac{x + y - 2}{7} \right|$

190.



In fig. 7 is shown a disc on which a player spins an arrow twice. The fraction $\frac{a}{b}$ is formed, where 'a' is the number of sector on which arrow stops on the first spin and 'b' is the number of the sector in which the arrow stops on second spin. On each spin, each sector has equal chance of selection by the arrow. Find the probability that the fraction $\frac{a}{b} > 1$.

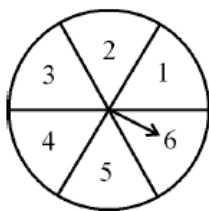


Fig. 7

191.

In fig. 9 is shown a right circular cone of height 30 cm. A small cone is cut off from the top by a plane parallel to the base. If the volume of the small cone is $\frac{1}{27}$ of the volume of given cone, find at what height above the base is the section made.

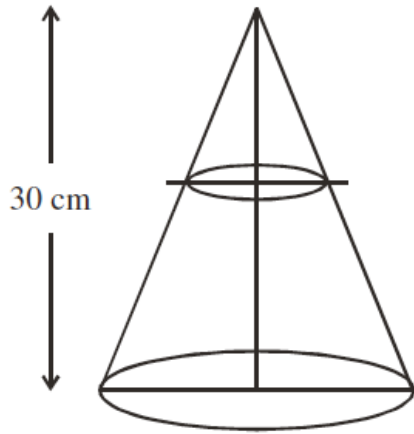


Fig. 9

192.

For what values of a , the quadratic equation $x^2 - ax + 1 = 0$ does not have real roots ?

193.

A letter of English alphabets is chosen at random. Find the probability that the chosen letter is a letter of the word TRIGONOMETRY.

194.

In fig.1, a circle touches the side BC of $\triangle ABC$ at F and touches AB and AC produced at D and E respectively. If $AD = 8$ cm, then find the perimeter of $\triangle ABC$.

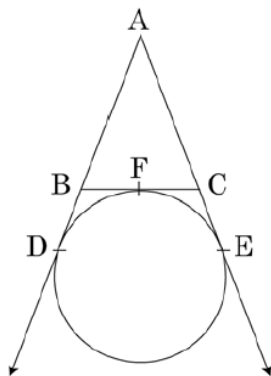


Fig.1

195.

If the sum of first 9 terms of an AP is equal to the sum of its first 11 terms, then find the sum of its first 20 terms.

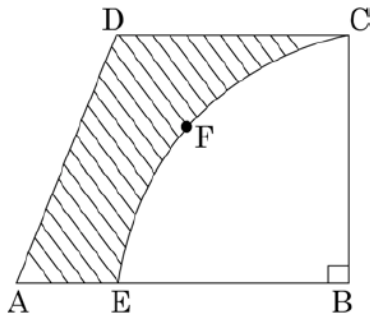


Fig.3

203.

A cone of maximum size is carved out from a solid cube of side 14 cm. Find the total surface area of the remaining solid left out.

204.

Two water taps together can fill a tank in $22\frac{2}{9}$ minutes. The tap of larger diameter takes 10 minutes less than the smaller one to fill the tank separately. Find the time in which each tap can separately fill the tank.

205.

A 1.6 m tall boy is standing at some distance from a 40 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.

206.

Believe in knowledge
A die is thrown twice. Find the probability that :

- (i) 5 will not come either time.
- (ii) Sum of numbers on the two dice is not more than 5.

207.

A 20 m deep well with diameter 7 m is dug and the earth from digging is evenly spread to form a platform $22\text{ m} \times 14\text{ m}$. Find the height of the platform.

208.

If the quadratic equation $px^2 - 2\sqrt{5}px + 15 = 0$ has two equal roots, then find the value of p.

209.

Two different dice are tossed together. Find the probability that the product of the two numbers on the top of the dice is 6.

210.

In Figure 2, PQ is a chord of a circle with centre O and PT is a tangent. If $\angle QPT = 60^\circ$, find $\angle PRQ$.

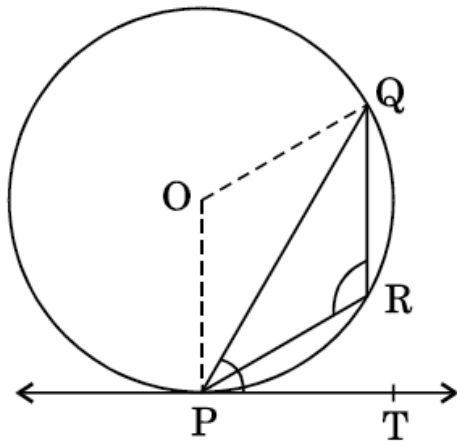


Figure 2

211.

In Figure 3, two tangents RQ and RP are drawn from an external point R to the circle with centre O. If $\angle PRQ = 120^\circ$, then prove that $OR = PR + RQ$.

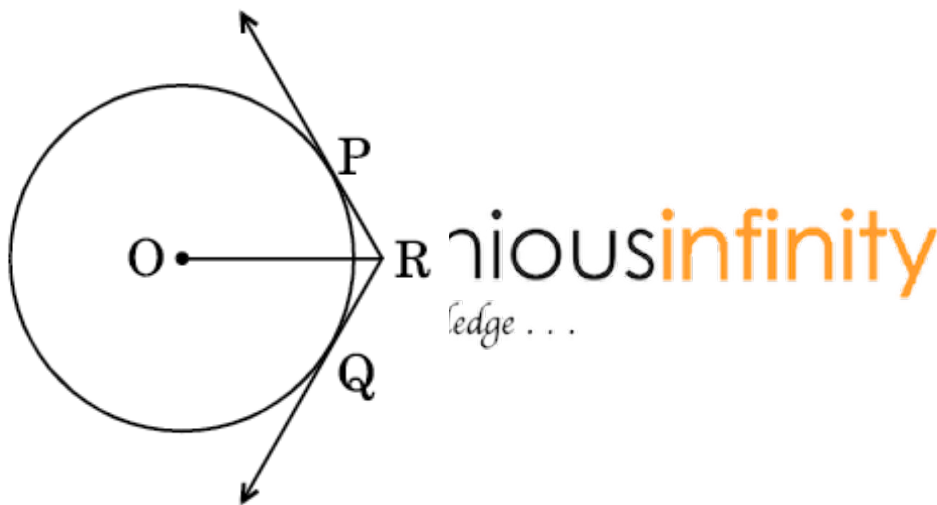


Figure 3

212.

In Figure 4, a triangle ABC is drawn to circumscribe a circle of radius 3 cm, such that the segments BD and DC are respectively of lengths 6 cm and 9 cm. If the area of ΔABC is 54 cm^2 , then find the lengths of sides AB and AC.

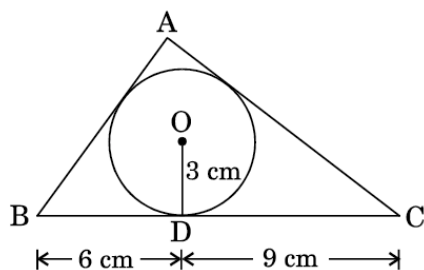


Figure 4

213.

In an AP, if $S_5 + S_7 = 167$ and $S_{10} = 235$, then find the AP, where S_n denotes the sum of its first n terms.

214.

The points $A(4, 7)$, $B(p, 3)$ and $C(7, 3)$ are the vertices of a right triangle, right-angled at B . Find the value of p .

215.

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 is $\frac{1}{3}$. If the jar contains 10 orange balls, find the total number of balls in the jar.

216.

A hemispherical bowl of internal diameter 36 cm contains liquid. This liquid is filled into 72 cylindrical bottles of diameter 6 cm. Find the height of the each bottle, if 10% liquid is wasted in this transfer.

217.

A cubical block of side 10 cm is surmounted by a hemisphere. What is the largest diameter that the hemisphere can have ? Find the cost of painting the total surface area of the solid so formed, at the rate of ₹ 5 per 100 sq. cm. [Use $\pi = 3.14$]

218.

504 cones, each of diameter 3.5 cm and height 3 cm, are melted and recast into a metallic sphere. Find the diameter of the sphere and hence find its surface area. [Use $\pi = \frac{22}{7}$]

219.

Find the 60th term of the AP 8, 10, 12, ..., if it has a total of 60 terms and hence find the sum of its last 10 terms.

220.

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 ?

221.

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 .

222.

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

- (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.

223.

Find the values of k so that the area of the triangle with vertices $(1, -1)$, $(-4, 2k)$ and $(-k, -5)$ is 24 sq. units.

224.

The tops of two towers of height x and y , standing on level ground, subtend angles of 30° and 60° respectively at the centre of the line joining their feet, then find $x : y$.

225.

A letter of English alphabet is chosen at random. Determine the probability that the chosen letter is a consonant.

226.

In Fig. 1, PA and PB are tangents to the circle with centre O such that $\angle APB = 50^\circ$. Write the measure of $\angle OAB$.

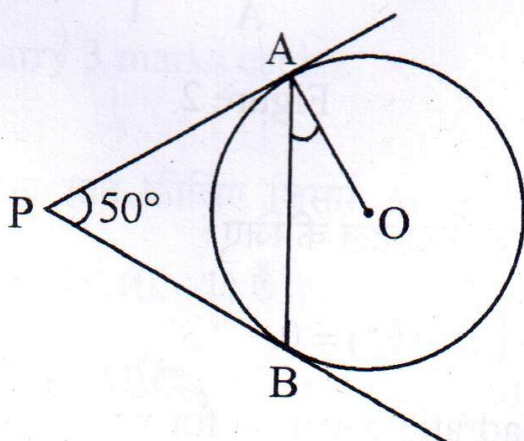


Figure 1

227.

In Fig. 2, AB is the diameter of a circle with centre O and AT is a tangent. If $\angle AOQ = 58^\circ$, find $\angle ATQ$.

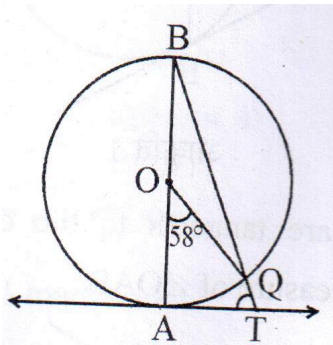


Figure 2

228.

If $A(5,2)$, $B(2,-2)$ and $C(-2,t)$ are the vertices of a right angled triangle with $\angle B = 90^\circ$, then find the value of t .

229.

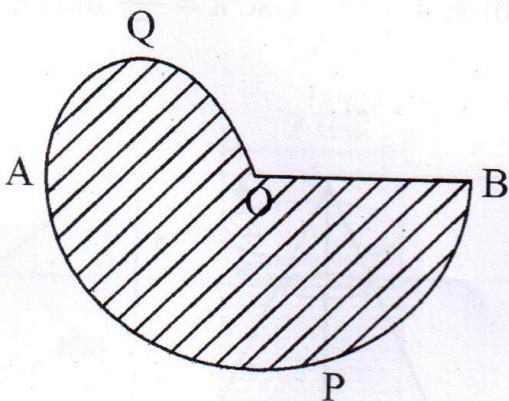
Find the area of the triangle ABC with $A(1, -4)$ and mid-points of sides through A being $(2, -1)$ and $(0, -1)$.

230.

If S_n , denotes the sum of first n terms of an A.P., prove that $S_{12} = 3(S_8 - S_4)$.

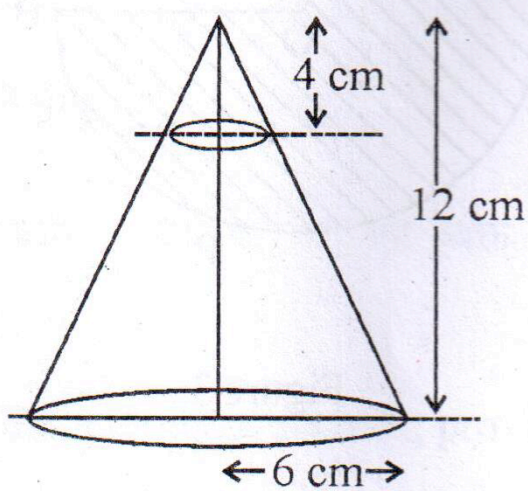
231.

In Fig. 3, APB and AQO are semicircles, and $AO = OB$. If the perimeter of the figure is 40 cm, find the area of the shaded region. $\left[\text{Use } \pi = \frac{22}{7} \right]$



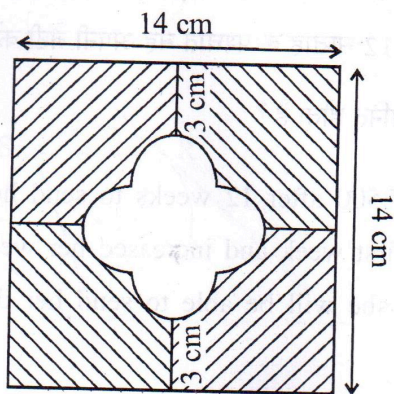
232.

In Fig. 4, from the top of a solid cone of height 12 cm and base radius 6 cm, a cone of height 4 cm is removed by a plane parallel to the base. Find the total surface area of the remaining solid. (Use $\pi = \frac{22}{7}$ and $\sqrt{5} = 2.236$)



233.

In Fig. 6, find the area of the shaded region [Use $\pi = 3.14$]

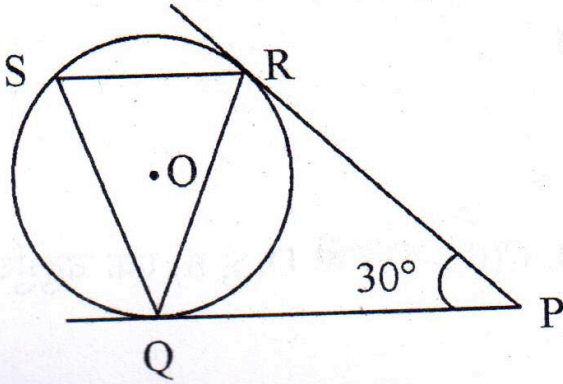


234.

The numerator of a fraction is 3 less than its denominator. If 2 is added to both the numerator and the denominator, then the sum of the new fraction and original fraction is $\frac{29}{20}$. Find the original fraction.

235.

In Fig. 7, tangents PQ and PR are drawn from an external point P to a circle with centre O, such that $\angle RPQ = 30^\circ$. A chord RS is drawn parallel to the tangent PQ. Find $\angle RQS$.



236.

A well of diameter 4 m is dug 14 m deep. The earth taken out is spread evenly all around the well to form a 40 cm high embankment. Find the width of the embankment.

237.

Water is flowing at the rate of 2.52 km/h through a cylindrical pipe into a cylindrical tank, the radius of whose base is 40 cm, If the increase in the level of water in the tank, in half an hour is 3.15 m, find the internal diameter of the pipe.

238.

Two concentric circles of radii a and b ($a > b$) are given. Find the length of the chord of the larger circle which touches the smaller circle.

239.

In Figure 1, O is the centre of a circle. PT and PQ are tangents to the circle from an external point P. If $\angle TPQ = 70^\circ$, find $\angle TRQ$.

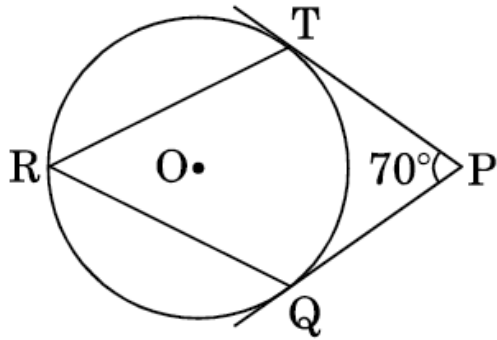


Figure 1

240.

Show that the points (a, a) , $(-a, -a)$ and $(-\sqrt{3}a, \sqrt{3}a)$ are the vertices of an equilateral triangle.

241.

Point A lies on the line segment PQ joining $P(6, -6)$ and $Q(-4, -1)$ in such a way that $\frac{PA}{PQ} = \frac{2}{5}$. If point P also lies on the line $3x + k(y + 1) = 0$,

find the value of k.

242.

Solve for x :

$$x^2 + 5x - (a^2 + a - 6) = 0$$

243.

A bag contains 18 balls out of which x balls are red.

- (i) If one ball is drawn at random from the bag, what is the probability that it is not red ?
- (ii) If 2 more red balls are put in the bag, the probability of drawing a red ball will be $\frac{9}{8}$ times the probability of drawing a red ball in the first case. Find the value of x.

244.

The long and short hands of a clock are 6 cm and 4 cm long respectively. Find the sum of the distances travelled by their tips in 24 hours. (Use $\pi = 3.14$)

245.

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

246.

A metallic cylinder has radius 3 cm and height 5 cm. To reduce its weight, a conical hole is drilled in the cylinder. The conical hole has a radius of $\frac{3}{2}$ cm and its depth is $\frac{8}{9}$ cm. Calculate the ratio of the volume of metal left in the cylinder to the volume of metal taken out in conical shape.

247.

In Figure 3, ABCD is a trapezium with $AB \parallel DC$, $AB = 18$ cm, $DC = 32$ cm and the distance between AB and DC is 14 cm. If arcs of equal radii 7 cm have been drawn, with centres A, B, C and D, then find the area of the shaded region.

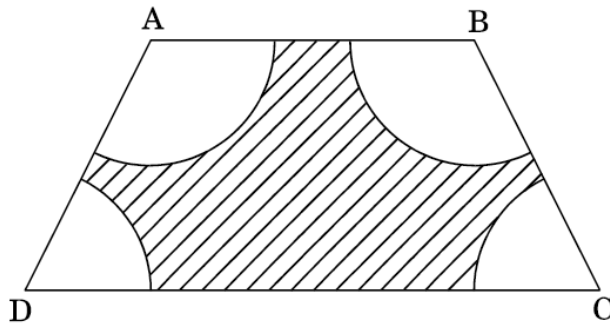


Figure 3

JSinfinity

248.

If $x = -2$ is a root of the equation $3x^2 + 7x + p = 0$, find the values of k so that the roots of the equation $x^2 + k(4x + k - 1) + p = 0$ are equal.

249.

Find the middle term of the sequence formed by all three-digit numbers which leave a remainder 3, when divided by 4. Also find the sum of all numbers on both sides of the middle term separately.

250.

The total cost of a certain length of a piece of cloth is ₹ 200. If the piece was 5 m longer and each metre of cloth costs ₹ 2 less, the cost of the piece would have remained unchanged. How long is the piece and what is its original rate per metre ?

251.

In Figure 4, O is the centre of the circle and TP is the tangent to the circle from an external point T. If $\angle PBT = 30^\circ$, prove that $BA : AT = 2 : 1$.

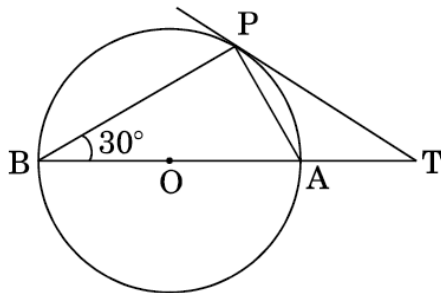


Figure 4

252.

A box contains cards bearing numbers from 6 to 70. If one card is drawn at random from the box, find the probability that it bears

- (i) a one digit number.
- (ii) a number divisible by 5.
- (iii) an odd number less than 30.
- (iv) a composite number between 50 and 70.

253.

The base BC of an equilateral triangle ABC lies on y-axis. The coordinates of point C are $(0, -3)$. The origin is the mid-point of the base. Find the coordinates of the points A and B. Also find the coordinates of another point D such that BACD is a rhombus.

254.

A vessel full of water is in the form of an inverted cone of height 8 cm and the radius of its top, which is open, is 5 cm. 100 spherical lead balls are dropped into the vessel. One-fourth of the water flows out of the vessel. Find the radius of a spherical ball.

255.

Milk in a container, which is in the form of a frustum of a cone of height 30 cm and the radii of whose lower and upper circular ends are 20 cm and 40 cm respectively, is to be distributed in a camp for flood victims. If this milk is available at the rate of ₹ 35 per litre and 880 litres of milk is needed daily for a camp, find how many such containers of milk are needed for a camp and what cost will it put on the donor agency for this. What value is indicated through this by the donor agency ?

256.

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.

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Answers(X)

- | | |
|--|---|
| 1. 6 | 2. $a = 3, b = 1$ |
| 3. 5 | 4. 10 |
| 5. 1:9 | 6. $\sqrt{37}$ |
| 9. 27 | 10. $(1, -12), (3, -10)$ |
| 11. -3, 13 | 12. $\frac{20}{3} \text{ cm or } 6\frac{2}{3} \text{ cm}$ |
| 13. $\frac{5}{3}$ | 14. $608\pi \text{ cm}$ |
| 15. $25\pi \text{ cm}^2$ | 16. $m = 5, n = 1$ |
| 17. $50 \text{ km/hr}, 40 \text{ km/hr}$ | 18. 150 m |
| 19. Rs. 24631.20 | 21. $20 \text{ h}, 30 \text{ h}$ |
| 22. $d = 2$ | 24. $3\sqrt{3} \text{ m}, 6\sqrt{3} \text{ m}$ |
| 25. Rs. 2802.80 | |
| 26. $f_1 = 8, f_2 = 12$ | 27. $\frac{1}{2}$ |
| 28. 2 | 29. $\frac{1}{9}$ |
| 30. $x = 22, y = 8$ | 31. $1:1, m = 1$ |
| 32. $\frac{1}{6}, \frac{1}{12}$ | 33. $a = 1, b = 1, \sqrt{10}$ |
| 34. 50 km/hr | 36. 42 km/hr |
| 37. 2, 6, 10, 14 or 14, 10, 6, 2 | 38. $\frac{1}{k} + (m - 1)$ |
| 39. $\sqrt{2} - 1$ | 40. $k = -8$ |
| 41. (16, 8) | 44. 18 cm |
| 45. $r = 4 \text{ cm}$ | 46. $18 \text{ h}, 9 \text{ h}$ |
| 47. 68 | 49. 2 m |
| 50. 35° | 51. $\frac{3}{8}$ |
| 52. ± 8 | 53. 60° |
| 55. $AC = 13 \text{ cm}, BC = 15 \text{ cm}$ | 56. 602.88 cm^2 |
| 57. 346.5 cm^2 | 58. 18.67 cm^2 |
| 59. $-\sqrt{2}, -\frac{5}{\sqrt{2}}$ | 60. 7 days |
| 61. 30 m | |
| 62. (i) 0 (ii) $\frac{9}{44}$ (iii) $\frac{1}{22}$ (iv) $\frac{3}{22}$ | 63. 40 sq. units |
| 64. 20 cm | 65. $57.2 \text{ l}, \text{Rs. } 2288$ |

66. 45°

68. 10 cm

70. -1

72. 189.28 m

74. 21 cm

76. $\frac{3}{4}$

79. $6:17$

81. 7 cm

83. (i) $\frac{1}{26}$, (ii) $\frac{3}{13}$

85. 8 cm

87. $\sqrt{\frac{2}{3}}, -\sqrt{\frac{2}{3}}$

89. 15 m

91. (i) 0 (ii) $\frac{1}{4}$ (iii) $\frac{1}{10}$

93. 180 cm

95. (i) $\frac{1}{20}$ (ii) $\frac{17}{100}$, (iii) $\frac{27}{100}$

97. $7, 49$

99. 3

101. 16

103. 1 cm

105. 11 cm

107. $\frac{10}{13}, \frac{1}{13}, \frac{1}{4}$

109. 7592.52 cm^2

111. 13 years

113. 2 cm

115. $\frac{7}{11}$

117. $924 - 441\sqrt{3}\text{ cm}^2$

119. 56

121. (i) $\frac{8}{25}$ (ii) $\frac{2}{5}$ (iii) $\frac{21}{25}$ (iv) $\frac{2}{25}$

123. 200 m

125. 11775 cm^3

67. $\frac{1}{m} + (n - 1)$

69. $-1, 5$

71. 105°

73. 4136 m^2

75. $(-7, 0)$

77. 2 h

80. $9\pi\text{ cm}^2$

82. $\frac{1}{4}$

84. 20°

86. $6:\pi$

88. 27 cm

90. 273 m

92. 4

94. 91.14 cm^2

96. 20 m

98. 1595

100. -9

102. 13

104. 450

106. 6 cm

108. 78.75 cm

110. 64

112. $a = 1, b = -3$

114. $3768\text{ cm}^3, 1318.8\text{ cm}^2$

116. 2

118. 4.8 minutes

120. $\text{Rs. } 3740$

122. $k = -3, h = \frac{24}{\sqrt{26}}\text{ units}$

124. $88\text{ l, Rs. } 30800$

126. $\frac{5}{2}$

127. 4 places

129. $\frac{6}{13}$

134. 2h

136. 120m

138. 60°

140. $\frac{6}{13}$

145. (14m - 6): (8m + 23)

147. 2cm

149. 40cm

151. $\frac{1}{3}$

153. x = 35

155. $\frac{1}{2}$

158. a = 3, b = -6

160. 7cm, 5cm, 3cm

162. 19

164. 4 squnits, 1 squnits

167. h = 4m

169. $\frac{1}{4}, \frac{1}{6}$

171. 6.6cm

173. 29.2 m/s

176. 20.93cm, 17.09cm²

178. $\frac{2}{5}$

180. 2: 1, k = $\frac{2}{3}$

184. 137.64cm²

186. 8, 12, 16, 20 or 20, 16, 12, 8

188. 6cm

191. 20cm

193. $\frac{9}{26}$

195. 0

128. 0

130. $\frac{1}{6}$

135. 1000

137. $\frac{p^2+1}{p^2-1}, -1$

139. k = 18

144. 410.67cm²

146. x = 0, x = 4

148. 9cm

150. $\frac{3}{8}, \frac{1}{2}, \frac{1}{2}$

152. 94.6cm

154. $\frac{5}{6}, 1: 9$

157. $\frac{1}{8}$

159. 5: 1

161. (16, 8)

163. 5cm

166. x = -1, x = $-\frac{3}{2}$

168. 4620cm³

170. 750km/hr

172. $x = \frac{ac+bc-2ab}{a+b-2c}$

174. 5 minutes

177. 15cm, 2160.32 cm²

179. 24

183. $2\sqrt{21}cm$

185. 29

187. $\frac{2a+b}{3}, \frac{a+2b}{3}$

190. $\frac{5}{12}$

192. $-2 < a < 2$

194. 16cm

197. $\frac{2}{3}$

198. 4960
200. $5(3 + \sqrt{3})m, 5(3 + \sqrt{3})m$
202. 17.01 cm^2
204. 50min, 40min
206. $\frac{25}{36}, \frac{5}{18}$
208. $p = 3$
210. 120°
212. $AB = 9\text{cm}, AC = 12\text{cm}$
214. 7, 4
216. 5.4 cm
218. $d = 21\text{cm}, 1386\text{cm}^2$
220. 36 km/hr
222. $\frac{4}{13}, \frac{1}{26}, \frac{11}{13}, \frac{2}{13}$
224. 1: 3
226. 25°
228. 1
231. $96\frac{1}{4} \text{ cm}^2$
233. 154.88 cm^2
235. 30°
237. 4cm
239. 55°
242. $a - 2, -a - 3$
244. 954.56 cm
246. 133: 2
248. $\frac{2}{3}, -1$
250. 20m, Rs. 10
253. $B(0, 3), A(3\sqrt{3}, 0), D(-3\sqrt{3}, 0)$
255. Rs. 30800
199. 30°
201. $\frac{11}{24}, \frac{1}{24}$
203. 1365.42 cm^2
205. 44.28cm
207. 2.5m
209. $\frac{1}{9}$
213. 1, 6, 11, ...
215. 24
217. Rs. 33.93
219. 126, 1170
221. 40m
223. $k = 3, k = -\frac{9}{2}$
225. $\frac{21}{26}$
227. 61°
229. 12 sq. units
232. 350.592 cm^2
234. $\frac{7}{10}$
236. 10m
238. $2\sqrt{a^2 - b^2}$
241. $\frac{18}{5}$
243. $\frac{18-x}{18}, 8$
245. 12cm
247. 196cm^2
249. 36400, 87024
252. $\frac{4}{65}, \frac{1}{5}, \frac{12}{65}, \frac{3}{13}$
254. 0.5cm
256. $\frac{11}{13}$

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