REAL NUMBERS

4^n 6^n 15^n for any natural number n. ends with the digit zero.

HCF and LCM of 90 and 144 by the method of prime factorization

Given that HCF (306, 1,314) = 18. Find LCM (306, 1,314)

Explain whether (7 x 13 x 11) + 11and (7 x 6 x 5 x 4 x 3 x 2 x 1) + 3 are composite numbers

$\sqrt{2}$ $3\sqrt{2}$ is irrational. $\frac{1}{\sqrt{2}}$ is rational $7\sqrt{5}$ be a rational number.

$6+\sqrt{2}$ be a rational number. $\sqrt{p}+\sqrt{q}$ is irrational

$2\sqrt{3}+\sqrt{5}$ is an irrational number. $\frac{2\sqrt{3}}{5}$ is irrational

$5+3\sqrt{2}$ is an irrational number.

Three bells toll at intervals of 9, 12, 15 minutes respectively. If they start tolling together, after whattime will they next toll together?

Find the HCF and LCM of 510 and 92 and verify that HCF x LCM = Product of two given numbers

POLYNOMIALS

Find the zeroes of the quadratic polynomial $x^2 + 7x + 10$, $x^2 - 2x$, $x^2 - 15$, $6x^2 - 3 - 7x$, $3x^2+7x+2$ and verify the relationship between the zeroesand the coefficients

If and are the zeroes of the polynomial $2x^2 - 4x + 5$, find the value of

(i) $\alpha^2 + \beta^2$
(ii) $\frac{1}{\alpha} + \frac{1}{\beta}$
(iii) $(\alpha - \beta)^2$
(iv) $\frac{1}{\alpha^2} + \frac{1}{\beta^2}$
(v) $\alpha^3 + \beta^3$

one zero of the polynomial is twice the other

one zero of the polynomial is reciprocal of the other

one zero of the polynomial is negative of the other

Find the quadratic polynomial, whose sum of zeroes is 8 and their products is 12. Then, find the zeroesof the polynomial

Find the quadratic polynomial whose zeroes are 2 and -6, respectively. Verify the relation between thecoefficients and zeroes of the polynomial.

3. PAIR OF LINEAR EQUATION IN TWO VARIABLES

unique solution , infinitely many solution, no solution

find out whether the following pairs of linear equations areconsistent, or inconsistent

find out whether the lines representing the following pairs of linear equationsintersect at a point or parallel or coincide.

substitution method , elimination method

Check graphically whether the pair of equations x + 3y = 6 and 2x – 3y = 12 is consistent. If so, solvethem graphically

The ratio of incomes of two persons is 9 : 7 and the ratio of their expenditures is 4 : 3. If each of themmanages to save Rs 2000 per month, then find their monthly incomes

Form the pair of linear equations in the following problems, and find their solutions graphically.5 pencils and 7 pens together cost Rs.50, whereas 7 pencils and 5 pens together cost 46. Find the costof one pencil and that of one pen.

Five years ago, Jacob's age was seven times that of his son. After five years, the age of Jacob will bethree times that of his son. Represent this situation algebraically and graphically

A and B are two points 150 km apart on a highway. Two cars start with different speeds from A and B atthe same time. If they move in the same direction, they meet in 15 h but if they move in the oppositedirections, they meet in 1 h. Find their speed

The sum of two numbers is 18 and the sum of their reciprocals is 9/40. Find the numbers.

A fraction becomes 9/11 if 2 is added to both numerator and denominator. If 3 is added to bothnumerator and denominator it becomes 5/6 . Find the fraction

The sum of the digits of a 2-digit number is 9. Also, nine times this number is twice the numberobtained by reversing the order of the digits. Find the number.

QUADRATIC EQUATIONS

Check whether the following are quadratic equations:
$x^2-3x+5=(x+5)^2$

Solve by fractorisation , quadratic formula

In a flight of 2800km, an aircraft was slowed down due to bad weather. Its average speed is reduced or increased by100km/h and time increased by 30 minutes. Find the original duration of the flight.

A motor boat whose speed is 24km/h in still water takes 1 hour more to go 32 km upstream than noreturn downstream to the same spot. Find the speed of the steam

One pipe can fill a tank in 3 hours less than another. The two pipes together can fill the tank in 6 hours40 minutes, find the time each pipe will take to fill tank

A student scored a total of 32 marks in class tests in mathematics and science. Had he scored 2 marksless in science and 4 more in mathematics, the product of his marks would have been 253. Find hismarks in two subjects

The area of a rectangle gets reduced by 9 square units, if its length is reduced by 5 units and breadth is increased by 3 units. If

we increase the length by 3 units and the breadth by 2 units, the area increases by 67 square units. Find the dimensions of the rectangle.

The length of the hypotenuse of a right triangle exceeds the length of its base by 2 crn and exceeds twicethe length of altitude by 1 cm. Find the length of each side of the triangle

The sum of squares of two consecutive even numbers is 340. Find the numbers

A two digit number is such that product of its digits is18 and if 63 is subtracted from it the digits got interchanged. Find the number

Sum of the areas of two squares is 468 m . If the difference of their perimeter is 24 m, find the sides ofthe two squares
Find the values of *k* for each of the following quadratic equations, so that they have two equal roots.
(i) $2x^2 + kx + 3 = 0$ (ii) $kx\,(x - 2) + 6 = 0$

Is it possible to design a rectangular plot of perimeter 180 m and area ? If so, find its lengthand breadth.

5. ARITHMETIC PROGRESSIONS

Write first four terms of the AP

Which term of the AP: 3, 8, 13, 18,....., is 78?

An AP consists of 50 terms of which 3rd term is 12 and the last term is 106. Find the 29th term.

How many terms of the A.P. 27, 24, 21, ... must be taken so that their sum is 105 ? Which term of the A.P. is zero ?

Which term of the AP: 3, 15, 27, 39, ... will be 132 more than its 54th term?

How many multiples of 4 lie between 10 and 250?

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

Find the sum of the following AP: 2, 7, 12, ..., to 10 terms

Find the sum of : (i) the first 1000 positive integers (ii) the first n positive integers

Write down the first four terms of the sequences whose general terms are $a_n = 2n + 3$

Find the sum of first 25 terms of an AP whose nth term is 1 - 4n.

Determine k so that k + 2, 4k - 6 and 3k - 2 are three consecutive terms of an AP

How many three digit natural numbers are divisible by 7?

In a potato race

Which term of the AP : 120, 116, 112, ... is first negative term?

How many terms of the A.P. 27, 24, 21, ... should be taken so that their sum is zero?

Find the sum of all even numbers between 101 and 999.

7. COORDINATE GEOMETRY

What point on the x-axis is equidistant from (7,6) and (-3,4)?

Find the coordinates of the points which divides the join of (-1,7) and (4,-3) in the ratio 2:3.

Find the coordinate of the points which divide the line segment joining A(-2,2) and B(2,8) into three / four equal parts

Find the ratio in which the line segment joining (1, -7) and (6, 4) is divided by x-axis./ y axis

The distance between the points P(x, -1) and Q(3, 2) is 5 units. Find the value of x.

The points A(3,2) and B(2,-3) are equidistant from a point P(x,y). Find the relation between x and y.

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

Find the coordinates of the points of trisection of the line segment joining (4,-1) and (-2,-3)

Line $4x + y = 4$ divides the line segment joining the points $(-2, -1)$ and $(3,5)$ in a certain ratio. Find the ratio.

If A and B are (-2, -2) and (2, -4), respectively, find the coordinates of P such that AP= 3/7 AB and P lies on the line segment AB.

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.

8. INTRODUCTION TO TRIGONOMETRY

If $7 \tan\theta = 4$, then find the value of $\frac{7\sin\theta - 3\cos\theta}{7\sin\theta - 3\cos\theta}$

Prove that $\frac{\sin\theta - 2\sin^2\theta}{2\cos^2\theta - \cos\theta} = \tan\theta.$

Evaluate

$$\frac{3\tan^2 30° + \tan^2 60° + cosec30° - \tan 45°}{\cot^2 45°}$$

Prove that : $\sqrt{\frac{1-\cos A}{1+\cos A}} = cosecA - \cot A$

Find the value of x in each of the following

x tan 45 °cos 60° = sin 60° cot 60°

Show that $\frac{1-\cos\theta}{1+\cos\theta} = (\operatorname{cosec}\theta - \cot\theta)^2$

If $\frac{x\,Sec^2 30^\circ . Sec^2\,45^\circ}{8\,Cos^2 45^\circ . Sin^2\,60^\circ} = Tan^2 60^\circ - Tan^2 30^\circ$, then find x

If cosec (A - B) = 2, cot (A + B) = $\frac{1}{\sqrt{3}}$,

$0^\circ < (A + B) \leq 90^\circ, A > B$ find A and B

Prove that $\frac{\sin\theta - \cos\theta + 1}{\sin\theta + \cos\theta - 1} = \frac{1}{\sec\theta - \tan\theta}$

Write all the other trigonometric ratios of A in terms of sec A.

$\frac{\cos A}{1+\sin A} + \frac{1+\sin A}{\cos A} = 2\sec A$

$(1 + \cot\theta - cosec\theta)(1 + \tan\theta + \sec\theta) = 2.$

If $cosec\theta - \sin\theta = m \quad and \quad \sec\theta - \cos\theta = n,$

,then prove that $(m^2 n)^{2/3} + (mn^2)^{2/3} = 1$

If $\cos\theta + \sin\theta = p$ and $\sec\theta + cosec\theta = q,$

prove that $q(p^2 - 1) = 2p$.

$(\sin\theta + cosec\theta)^2 + (\cos\theta + \sec\theta)^2 = 7 + \tan^2\theta + \cot^2\theta$

$\frac{\tan\theta}{1-\cot\theta} + \frac{\cot\theta}{1-\tan\theta} = 1 + \sec\theta cosec\theta$

$\frac{\sin\theta + 2\sin^3\theta}{2\cos^3\theta - \cos\theta} = \tan\theta$

If $x = a\cos\theta - b\sin\theta$ and $y = a\sin\theta + b\cos\theta$, then prove that $a^2 + b^2 = x^2 + y^2$

9. SOME APPLICATIONS OF TRIGONOMETRY

A tree is broken by the wind. The top struck the ground at an angle of 45^0 and it a distance 35m fromthe foot. Then the whole height of the tree before broken

A tower stands vertically on the ground. From a point on the ground 100 m away from the foot of thetower, the angle of elevation of the top of the tower is 45^0 . Find the height of the tower

When the length of the shadow of a pole of height 10 m is equal to 10 m, then find the angle of elevationof these source of light.

A vertical tower of height 90 m stands on the ground. The angle of elevation of the top of the tower asobserved from a point on the ground is 60^0. Find the distance of the point from the foot of the tower

From the top of a tower 100 m high, a man observes two cars on the opposite sides of the tower withangles of depression 30^0 and 45^0 respectively. Find the distance between the cars

The angle of depressions of two ships from the top of a light house and on the same side of it are foundto be 45^0 and 30^0 . If the ships are 200 m apart, then find the height of the light house

From the top of a tower 100 m high, the angle of depression of the top and bottom of a pole are observedto be 45^0 and 60^0 . Find the height of the pole

The angle of elevation of a jet fighter from a point A on the ground is 60.After 15 seconds flight, theangle of elevation changes from 60^0 to 30^0. If the jet is flying at a speed of 200m/sec, find the height atwhich the jet fighter is flying

A man on the deck of a ship is 12 m above the water level.He observes that the angle of elevation of thetop of a cliff is 45^0 and the angle of depression of the base is 30^0.Calculate the distance of the cliff fromthe ship and the height of the cliff

A 1m tall boy is standing at some distance from a 21m tall building.The angle of elevation from his eyesto the top of the building increases from 30^0 to 45^0 as he walks towards the building.Find the distancehe walked towards the building

From the top of a 7m high building, the angle of elevation of the top of a tower is 60^0 and the angle ofdepression of the foot of the tower is 30^0 find the height of the tower

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 60^0 and from the same point the angle of elevation of the top of the pedestal is 45^0 . Find the height of the pedestal

Two poles of equal heights are standing opposite to each other on either side of the road, which is 80 mwide. From a point between them on the road, the angles of elevation of the top of the poles are 60°and 30°, respectively. Find the height of the poles and the distances of the point from the poles.

A vertical tower is surmounted by a flag staff of height 5 metres.At a point on the ground, the angles ofelevation of bottom and top of flag staff are 45^0 and 60^0 respectively.Find the height of the tower

11. AREAS RELATED TO CIRCLES

A pendulum swings through an angle of 30^0 and describes an arc 8.8 cm in length. Find the length ofpendulum

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

The length of the minute hand of a clock is 14 cm. Find the area swept by the minute hand in 5minutes

Find the area of the segment of a circle of radius 14 cm, if the length of the corresponding arc APB is 22cm.

A car has two wipers which do not overlap.Each wiper has a blade of length 25 cm sweeping through anangle of 115°.Find the total area cleaned at each sweep of the blades

What is the perimeter of a sector of angle of 45^0 a circle with radius 7 cm?

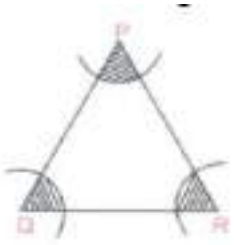
If the diameter of a semicircular protractor is 14 cm, then find its perimeter.

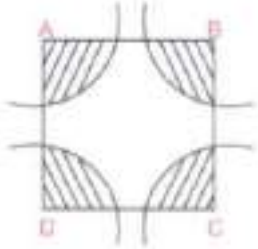
AB and CD are respectively arcs of two concentric circles of radii 21 cm and 7 cm and center O (seefigure). If find the area of the shaded region

OABC is a quadrant of a circle of radius 7 cm. If OD=4 cm, find the area of the shaded region

$[Use\ \pi = \frac{22}{7}]$

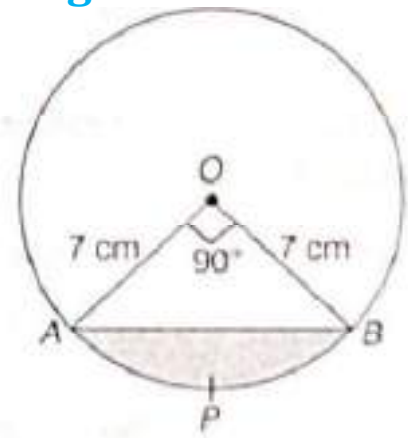
In figure arcs have been drawn with radii 14 cm each and with centres P, Q and R. Find the area of theshaded region.



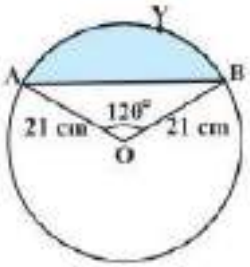


Three cows are tethered with 10 m long rope at the three corners of a triangular field having sides 42 m,20 m and 34 m. Find the area of the plot which can be grazed by the cows, also, find the area of the remaining field

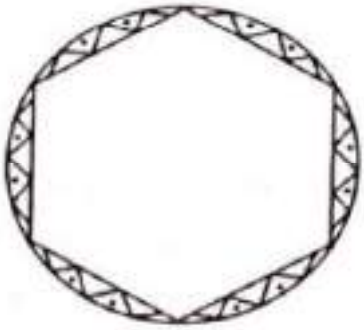
In the given figure, AB is a chord of a circle of radius 7 cm and centred at O. Find the area of the shadedregion if AOB= 90°. Also, find length of minor arc AB.



Find the area of the segment AYB shown in Figure, if radius of the circle is 21 cm and □AOB = 120□

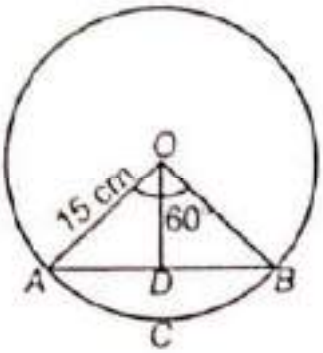


A round table cover has six equal designs as shown in the figure. If the radius of the cover is 28 cm, findthe cost of making the designs at the rate of Rs. 0.35 per cm² . [take,root3 = 1.732]



In a circle of radius 21 cm, an arc subtends an angle of 60^0 at the centre.Find(i) Length of the arc.(ii) Area of the sector formed by the arc.(iii) Area of the segment formed by the corresponding chord

A chord of a circle of radius 15 cm subtends an angle of 60^0 at the centre. Find the areas of thecorresponding minor and major segments of the circle $(Use\ \pi = 3.14 \quad \text{and} \quad \sqrt{3} = 1.73)$



12. SURFACE AREAS AND VOLUMES

2 cubes each of volume 64 cm^3 are joined end to end. Find the surface area of the resulting cuboid

A vessel is in the form of a hollow hemisphere mounted by a hollow cylinder. The diameter of thehemisphere is 14 cm and the total height of the vessel is 13 cm. Find the inner surface area of the vessel.

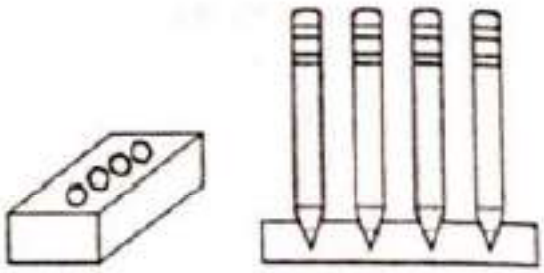
A solid is in the shape of a cone standing on a hemisphere with both their radii being equal to 1cm andthe height of the cone is equal to its radius.Find the volume of the solid in terms of π

A brooch is made with silver wire in the form of a circle with diameter 35 mm. The wire is also used in making 5 diameters which divide the circle into 10 equal sectors as shown in figure. Find:

1. the total length of the silver wire required.

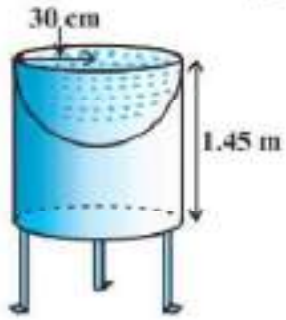
2. the area of each sector of the brooch.

A pen stand made of wood is in the shape of a cuboid with four conical depressions to hold pens.Thedimensions of the cuboid are 15cmx10 cmx3.5 cm. The radius of each of the depressions is 0.5 cmand the depth is 1.4cm. Find the volume of wood in the entire stand (see figure).



Mayank made a bird-bath for his garden in the shape of a cylinder with a hemispherical depression atone end (see fig.).

The height of the cylinder is 1.45 m and its radius is 30 cm. Find the total surface areaof the bird-bath

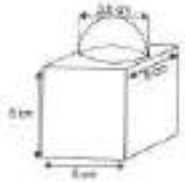


A conical military tent having diameter of the base 24m and slant height of the tent is 13m, find thecurved surface area cone

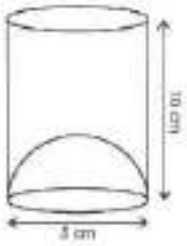
A godown building is in form as shown in the figure.The vertical cross section parallel to the width sideof the building is a rectangle of dimensions 7m x 3m, mounted by semicircle of radius 3.5m.The innermeasurements of the cuboidal portion of the building are 10m x 7m x 3m.Find the interior surfaceexcluding the floor.

A toy is in the shape of a right circular cylinder with a hemisphere on one end and a cone on theother.The radius and height of the the cylindrical part are 5cm and 13cm respectively part.The radii ofthe hemispherical and conical parts are the same as that of the cylinder part.Find the surface area ofthe toy if the total height of the toy is 30cm.

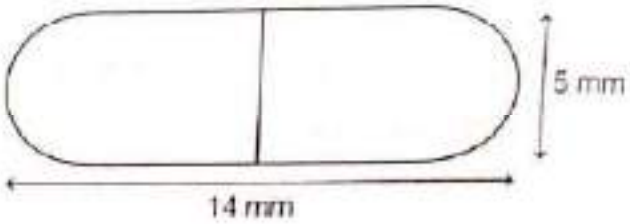
The decorative block shown in fig. is made of two solids - a cube and a hemisphere. The base of theblock is a cube with edge 6 cm, and the hemisphere fixed on the top has a diameter of 3.5 cm. Find thetotal surface area of the block



A milkman while supplying milk to their customer measures milk with a measuring cane which iscylindrical in shape with hemispherical raised bottom. The diameter of the measuring cylinder is 5 cmand height of the cylinder is 10 cm.(i) Find the volume of measuring cane.(ii) Which mathematical concept is used in given problem?

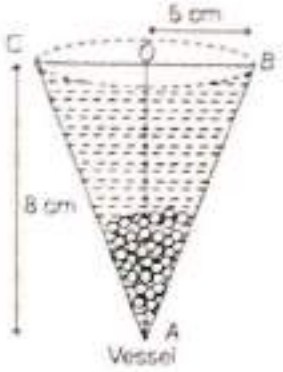


A medicine capsule is in the shape of a cylinder with two hemispheres stuck to each of its ends (seebelow figure). The length of the entire capsule is 14 mm and the diameter of the capsule is 5 mm. Findits surface area.



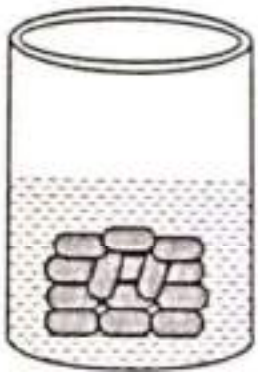
A vessel is in the form of an inverted cone. Its height is 8 cm and the radius of its top, which is open, is5 cm. It is filled with water up to the brim. When lead shots, each of which is a sphere of radius 0.5 cmare

dropped into the vessel, one- fourth of the water flows out. Find the number of lead shots droppedin the vessel.

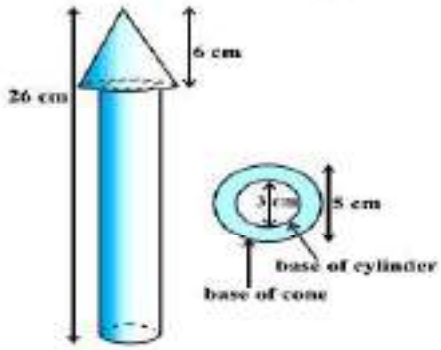


A wooden article was made by scooping out a hemisphere from each end of a solid cylinder, as shown inFig. If the height of the cylinder is 10 cm, and its base is of radius 3.5 cm, find the total surface area ofthe article.

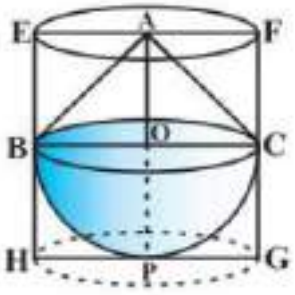
A gulab jamun, contains sugar syrup up to about 30% of its volume.Find approximately how muchsyrup would be found in 45 gulab jamuns, each shaped like a cylinder with two hemispherical endswith length 5cm and diameter 2.8cm .



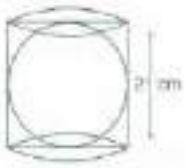
A wooden toy rocket is in the shape of a cone mounted on a cylinder, as shown in figure. The height ofthe entire rocket is 26 cm, while the height of the conical part is 6 cm. The base of the conical portionhas a diameter of 5 cm, while the base diameter of the cylindrical portion is 3 cm. If the conical portionis to be painted orange and the cylindrical portion yellow, find the area of the rocket painted with eachof these colours.



A solid toy is in the form of a hemisphere surmounted by a right circular cone. The height of the cone is2 cm and the diameter of the base is 4 cm. Determine the volume of the toy. If a right circular cylindercircumscribes the toy, find the difference of the volumes of the cylinder and the toy. (Take = 3.14)



Ashwani, a factory owner wants to thank all his workers by gifting a decorated spherical ball. Thediameter of the sphere is (2a+5) cm. Each ball is to be packed in a right circular cylindrical box whichjust encloses a sphere as shown in the figure.If the height of the cylinder is 21 cm, then (i) what is the value of a?(ii) what is the curved surface area of a sphere?(iii) which value are shown by Ashwani?



13. STATISTICS

Find the mode of the data, using an empirical formula, when it is given that median=41.25 andmean=33.75

Find p, the mean of the given data is 15.45.

CLASS INTERVAL	0-6	6-12	12-18	18-24	24-30
FREQUENCY	6	8	p	9	7

Compute the median for the following data.

CLASS INTERVAL (LESS THAN)	20	30	40	50	60	70	80	90	100
CUMULATIVE FREQUENCY	0	4	16	30	46	66	82	92	100

The ages of employees in a factory are as follows:

AGE (IN YEARS)	17-23	23-29	29-35	35-41	41-47	47-53
NUMBER OF EMPLOYEES	2	5	6	4	2	1

Find the median age of the employees.

Find the mode of the following distribution

CLASSES	25-30	30-35	35-40	40-45	45-50	50-55
FREQUENCY	25	34	50	42	38	14

In this following frequency distribution table, find the missing values.

CLASS INTERVAL	0-8	8-16	16-24	24-32	32-40	40-48
FREQUENCY	15	f_1	f_2	18	9	f_3
CUMULATIVE FREQUENCY	15	28	43	61	f_4	80

Calculate mode of the following data.

MARKS OBTAINED	0-20	20-40	40-60	60-80	80-100
NUMBER OF STUDENTS	8	10	12	6	3

Find the mean of the following distribution

Height (in cm)	Less than 75	Less than 100	Less than 125	Less than150	Less than 175	Less than 200
No of students	5	11	14	18	21	28
Height (in cm)	Less than 225	Less than 250	Less than 275	Less than 300		
No of students	33	37	45	50		

Find the mean age in years from distribution given below:

CLASS INTERVAL OF AGE IN YEAR	FREQUENCY (F_I)
25-29	4
30-34	14
35-39	22
40-44	16
45-49	6
50-54	5
55-59	3

The median of the following data is 525. Find the values of x and y if the total frequency is 100.

Class Interval	0-100	100-200	200-300	300-400	400-500	500-600	600-700	700-800	800-900	900-1000
Frequency	2	5	x	12	17	20	y	9	7	4

Calculate the mode of the following frequency distribution table.

MARKS	NUMBER OF STUDENTS
25 or more than 25	52
35 or more than 35	47
45 or more than 45	37
55 or more than 55	17
65 or more than 65	8
75 or more than 75	2
85 or more than 85	0

Class-Interval	c.f	No of students
0-10	7	7
10-20	21	14
20-30	34	13
40-50	66	20
50-60	77	11
60-70	92	15
70-80	100	8

Find the median of the following data

Profit (in lakh of rupee)	Number of shops
More than or equal to 5	30
More than or equal to 10	28
More than or equal to 15	16
More than or equal to 20	14
More than or equal to 25	10
More than or equal to 30	7
More than or equal to 35	3

Classes	f	c.f
5-10	2	2
10-15	12	14
15-20	2	16
20-25	4	20
25-30	3	23
30-35	4	27
35-40	3	30
Total	$\Sigma f = 30 = N$	

14. PROBABILITY

Two coins / three coins are tossed simultaneously. Find the probability of getting exactly one head, at least one head, at most one head

A pair of dice is thrown once. Find the probability of getting the same number on each dice / sum of 8 / multiple of 12 / sum of prime /(a) 5 will not come up on either of them?(b) 5 will come up on at least one?(c) 5 will come up at both dice?

A card is drawn at random from a well-shuffled deck of playing cards. Find the probability of drawing a(i) face card (ii) card which is neither a king nor a red card

All the three face cards of spades are removed from a well-shuffled pack of 52 cards. A card is thendrawn at random from the remaining pack. Find the probability of getting(i) a black face card, (ii) a queen, (iii) a black card

Find the probability of getting 53 Fridays in a leap year

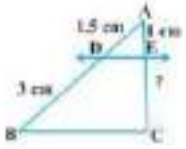
Find the probability that a non-leap year selected at random will have 53 Tuesdays

Cards marked with numbers 3, 4, 5, ..., 50 are placed in a box and mixed thoroughly. One card isdrawn at random from the box. Find the probability that number on the drawn card is(i) divisible by 7(ii) a number which is a perfect square / a prime number less than 30 / an odd number

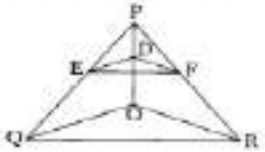
6. TRIANGLES

State and Prove Basic Proportionality theorem

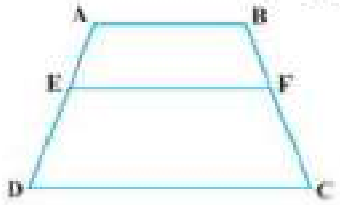
See the given Figure. DE || BC. Find EC



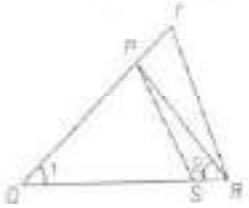
In the given figure, DE || OQ and DF || OR. Show that EF || QR.



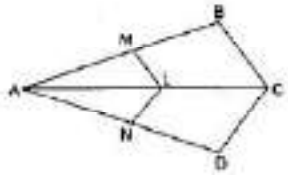
ABCD is a trapezium with AB || DC. E and F are points on non-parallel sides AD and BC respectively such that EF is parallel to AB. Show that $\frac{AE}{ED} = \frac{BF}{FC}$.



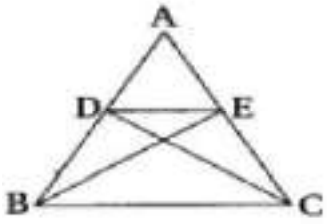
In the given figure, $\frac{QR}{QS} = \frac{QT}{PR}$ and $\angle 1 = \angle 2$. Show that $\triangle PQS \sim \triangle TQR$.



In the given figure, if LM II CB and LN II CD. Prove that $\frac{AM}{AB} = \frac{AN}{AD}$.



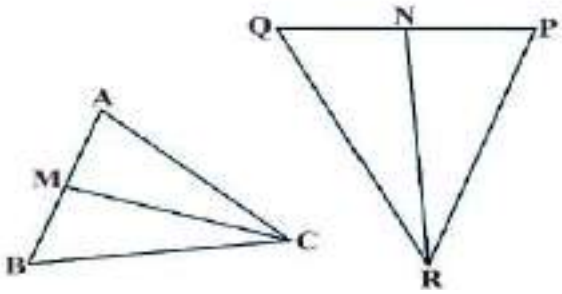
In the given figure, if ΔABE ⍰ΔACD, show that ΔADE ~ ΔABC



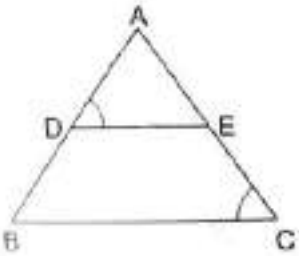
In given Fig.CM and RN are respectively the medians of ΔABC andΔ PQR. If ΔABC ~ΔPQR, prove that :

(i) ΔAMC ~ ΔPNR

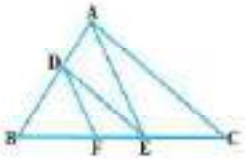
(ii) $\frac{CM}{RN} = \frac{AB}{PQ}$



In the given figure, $\frac{AD}{DB} = \frac{AE}{EC}$ and < ADE = < ACB. Prove that ΔABC is an isosceles triangle.



In the given figure, if DE II AC and DF II AE. Prove that $\frac{BF}{FE} = \frac{BE}{EC}$.

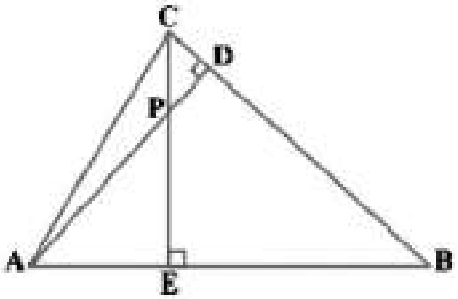


In the given figure, altitudes AD and CE of Δ ABC intersect each other at the point P. Show that

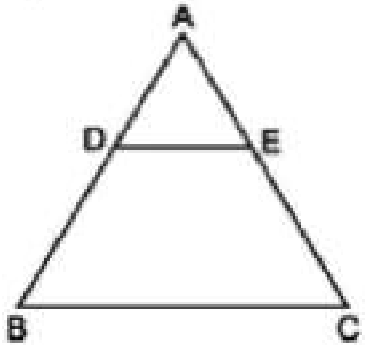
(i) Δ AEP ~ Δ CDP

(ii) Δ ABD ~ Δ CBE

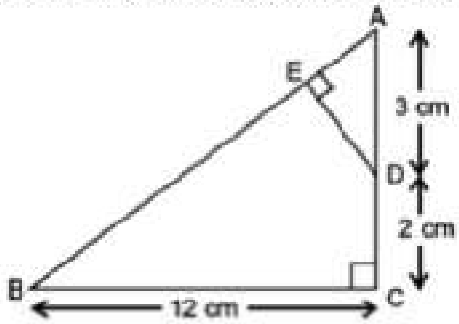
(iii) Δ AEP ~ Δ ADB



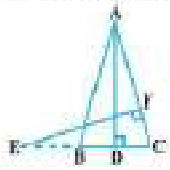
Prove that if a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, then other two sides are divided in the same ratio.
Use this theorem to find the value of x in the following question
In ΔABC, DE || BC. If BD = x – 3, AB = 2x, CE = x – 2 and AC = 2x + 3.



In figure, ΔABC is right angled at C and DE ⊥ AB. Prove that ΔABC ~ ΔADE and hence find the lengths of AE and DE.



In the given figure, E is a point on side CB produced of an isosceles ΔABC with AB = AC. If AD ⊥ BC and EF ⊥ AC, prove that ΔABD ~ ΔECF.

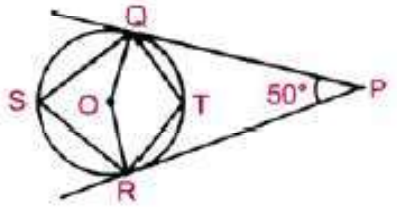


In the given figure A, B and Care points on OP, OQ and OR respectively such that AB II PQ and AC II PR. Prove that BC II QR.

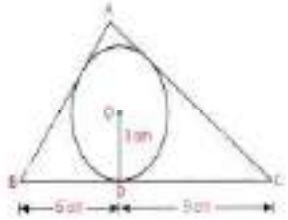
10. CIRCLES

Find the length of the tangent drawn from a point whose distance from the centre of a circle is 35cm.Given that radius of the circle is 7cm

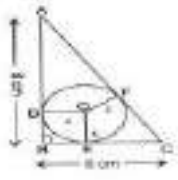
In the figure given below, find $\angle QSR$.



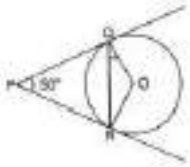
In figure, a triangle ABC is drawn to circumscribe a circle of radius 3cm, such that the segments BDand DC are respectively of lengths 6cm and 9cm.If the area of ABC is 54cm, then find the lengths ofsides AB and AC



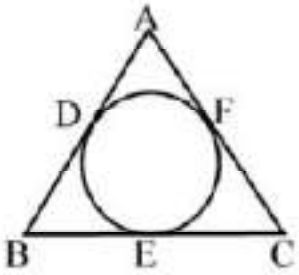
ABC is a triangle right-angled at point B with BC=6 cm and AB=8cm. A circle with centre O and radiusx cm has been inscribed in as shown in figure. Find the value of x.



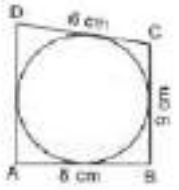
In figure, PQ and PR are the tangents to the circle with centre O such that . Then degree measure of . ∠QPR = 50° find∠OQR



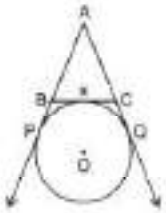
In the given figure, if AB = AC then prove that BE = CE



In the given figure, a circle touches all the four sides of a quadrilateral ABCD, whose sides AB = 8cm,BC = 9 cm and CD = 6 cm. Find AD.



In given figure, find the perimeter of $\angle ABC$, if AP = 10 cm.



If the radii of two concentric circles are 5 cm and 13 cm, then find the length of the chord of one circlewhich is tangent to the other circle

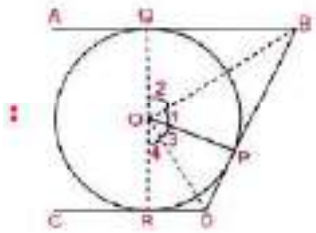
In the given figure, AB, AC and PQ are tangents. If AB = 5 cm, then find the perimeter of triangle APQ.

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

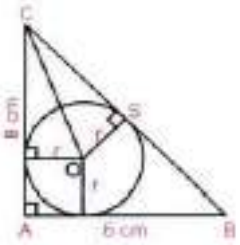
Prove that the perpendicular at the point of contact to the tangent to a circle passes through the centre

The lengths of tangents drawn from an external point to a circle are equal.

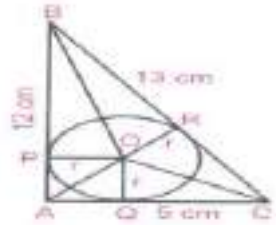
Prove that the intercept of a tangent between two parallel tangents to a circle subtends a right angle atthe centre



In the given figure, ABC is a right-angled triangle, right angled at A, with AB =6cm and AC=8cm.A circlewith centre O has been inscribed inside the triangle Calculate the value of r, the radius of the inscribedcircle.



ABC is a right-angled triangle, right angled at A.A circle is inscribed in it.The lengths of two sidescontaining the angle are 24cm and 10cm.Find the radius of the incircle.

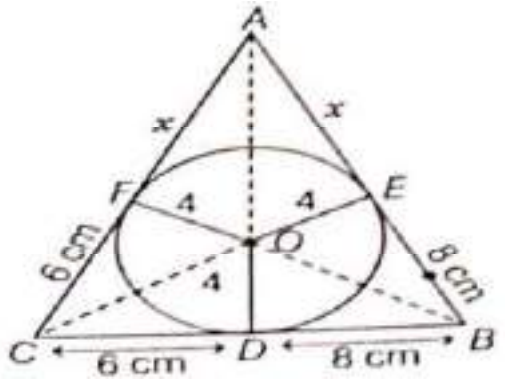


A circle touches the side BC of a ΔABC at P and AB and AC when produced at O and R respectively as shown in the figure. Show that AQ $=\frac{1}{2}$ or show that AQ $=\frac{1}{2}(BC+CA+AB)$

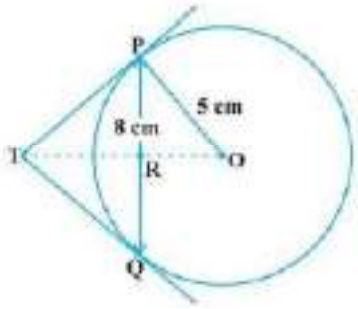
Prove that the lengths of tangents drawn from an external point to a circle are equal.

Prove that the parallelogram circumscribing a circle is a rhombus

A triangle ABC is drawn to circumscribe a circle of radius 4 cm such that the segments BD and DC intowhich BC is divided by the point of contact D are of lengths 8 cm and 6 cm respectively (see Fig). Findthe sides AB and AC



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(see the fig). Find the length TP.



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