

IMPORTANT QUESTIONS

CLASS X

MATHS

REAL NOS

1. Prove that following nos. are irrational
a) $\sqrt{3}$ b) $\sqrt{2} + \sqrt{5}$ c) $3 - \sqrt{2}$
2. Is there any natural no. n for which $(15)^n$ is an even no.
3. Find the HCF of 65 and 117 and express it in linear form
4. The decimal expansion of the rational no. $\frac{1478}{1250}$ will terminate after how many decimal places
5. Prove that $n^2 - n$ is divisible by 2 for every positive integer n .

POLYNOMIALS

1. Form a cubic polynomial whose zeroes are 2, -2 and 3
2. Find the zeroes of a cubic polynomial $p(x) = x^3 + 6x^2 + x - 30$ when it is given that the product of two of its zeroes is -6
3. Find k so that $x^2 + 2x + k$ is a factor of $2x^4 + x^3 - 14x^2 + 5x + 6$. Also find all zeroes of the two polynomials
4. If α and β are zeroes of $2x^2 - 4x + 5$. find the value of $1/\alpha + 1/\beta$
5. What should be added to $p(x) = x^4 - 5x + 6$ so that the resulting polynomial is exactly divisible by $2 - x^2$?
6. Find all the zeroes of the polynomial $2x^3 + x^2 - 6x - 3$, if two of its zeroes are $\sqrt{3}$ and $-\sqrt{3}$

LINEAR EQUATION

1. Find the value of k for which system of equations $kx + 2y - 5 = 0$; $3x + 4y - 1 = 0$ has no solution
2. Solve for X and Y : $\frac{5}{X-1} + \frac{1}{Y-2} = 2$; $\frac{6}{X-1} - \frac{3}{Y-2} = 1$
3. Solve the given system of equations graphically $x - y = 1$; $2x + y = 8$. Shade the area bounded by these lines and y -axis; Also find the area
4. 2 women and 5 men can together finish a work in 4 days while three women and 6 men can finish it in 3 days. Find the time taken by 1 woman and 1 man alone ?
5. Places A and B are 80km apart from each other, on a high way. A car starts from A and another starts from B at the same time. if they move in the same direction, they meet in 8 hours and if they move in opposite direction they meet in 1 hour and 20 minutes. Find the speed of the cars.

QUADRATIC EQUATIONS

1. Sum of a number and its reciprocal is $5/6$. Obtain a quadratic equation taking the number as variable, Find the number also.

2 Sum of two numbers is 15 and their product is 54 . Obtain a quadratic equation in x. If x is one of these two number.

3 For what value, of k , 4 is root of the quadratic equation $x^2 - kx + 16 = 0$

4 Solve for x : $\frac{4}{x-3} = \frac{5}{2x+3}$,x is not 0

5 Find the value of α such that the quadratic equation: $(-12)x^2 + 2(\alpha - 12)x + 2 = 0$ has equal roots.

ARITHMETIC PROGRESSION

1. Determine the ap whose fourth term is 18 and the difference of the ninth term from the fifteenth term is 30
2. Find the sum of all odd integers between 2 to 100 divisible by 3
3. How many terms are there in sequence 3, 6, 9,,111
4. Which term of the AP is the first negative term AP 121,117,113,....
5. Determine k so that $k+2, 4k-6$ and $3k-2$ are the three consecutive terms of ap
6. If the sum of first seven terms of an AP is 49 and that of 17 terms is 289 find the sum of first n terms

TRIANGLES

1. State and prove Basic Proportionality Theorem, also prove converse of it
2. State and prove Pythagoras theorem, also prove converse of it
3. If D and E are points on sides AB and AC respectively of a $\triangle ABC$, such that $DE \parallel BC$ and $BD = CE$.Prove that $\triangle ABC$ is isosceles.
4. ABCD is a trapezium with $AB \parallel CD$, show that if diagonals intersect each other at O then $\frac{AO}{BO} = \frac{CO}{DO}$
5. Prove that ratio of areas of two similar triangles is equal to the square of the ratio of their corresponding sides or heights
6. In the given fig. A, B, C are the points on OP, OQ, OR respectively such that $AB \parallel PQ$, $AC \parallel PR$. Show that $BC \parallel QR$



COORDINATE GEOMETRY

1. If the points A(1,-2), B(2,3), C(-3,2) and D(-4,-3) are the vertices of a parallelogram ABCD, find the area of parallelogram. Taking AB as the base ,find the height of the parallelogram
2. If the point P(x , y) is equidistant from points A(5,1) and B(-1,5),Prove that $3x = 2y$
3. For what value of k ,points (k,2-2k),(-k+1,2k) and (-4-k,6-2k) are collinear
4. Find the ratio in which y-axis divides the line segment joining the points (5,-6) and (-1,-4).Also find the point of intersection
5. Show that the points (7,3);(3,0);(0,-4) and (4,-1) are vertices of rhombus. find the area of rhombus
6. Find the coordinates of the points of trisection of line segment joining (4,-1) and (-2,-3)

INTRODUCTION TO TRIGONOMETRY

1. If $\operatorname{cosec} \theta = 13/12$, find the value of $\frac{2 \sin \theta - \cos \theta}{4 \sin \theta - 9 \cos \theta}$
2. If A and B are acute angles such that $0^\circ \leq A + B \leq 90^\circ$ and $\sin (A + B) = 1$ and $\cos (A - B) = \frac{\sqrt{3}}{2}$. Find angles A and B .
3. Evaluate $\frac{\sin 18^\circ}{\cos 72^\circ} + \sqrt{3} (\tan 10^\circ \tan 30^\circ \tan 40^\circ \tan 50^\circ \tan 80^\circ)$
4. If $\cot 4A = \tan (A - 20^\circ)$ where 4A is an acute angle find A.
5. If A,B,C are interior angles of a triangle then prove that $\tan \frac{B+C}{2} = \cot \frac{A}{2}$
6. Find value of $\sin 60^\circ$ and $\cos 60^\circ$ geometrically.
7. Prove the following identities:

$$\sin^2 \theta + \cos^2 \theta = 1; 1 + \tan^2 \theta = \sec^2 \theta; 1 + \cot^2 \theta = \operatorname{cosec}^2 \theta$$

HEIGHT AND DISTANCE

1. An airplane flying horizontally at a height of 2500 m above the ground is observed at an elevation of 60° . If after 15 seconds the angle of elevation is observed to be 30° , find the speed of the airplane in km per hour.
2. From the top of hill, the angles of depression of two consecutive kilometer stones due east are found to be 30° and 45° respectively. Find the height of the hill. ($\sqrt{3} = 1.732$)
3. On a horizontal plane there is a vertical tower with a flag pole on the top of the tower. At a point 9 m away from the foot of the tower the angle of elevation of the top and the bottom of the flagpole are 60° and 30° . Find the height of the tower and the flag pole mounted on it.

- A man standing on the deck of a ship, which is 8 m above the water level, observes the angle of elevation of the top of a hill as 60° and the angle of the depression of the base of the hill as 30° . Calculate the distance of the hill from the ship and the height of the hill.
- A man on the top of a vertical tower observes a car moving at a uniform speed coming directly towards it. If it takes 12 minutes for the angle of depression to change from 30° to 45° . How soon will, the car reach the tower?

CONSTRUCTIONS

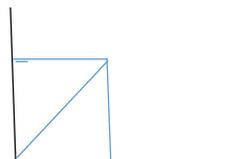
- Draw a line segment of 8cm and divide it in ratio 2:3
- Construct tangents to a circle inclined at angle of 60°
- Construct a $\triangle ABC$ with $AB= 5\text{cm}, BC= 6\text{cm}$ and $AC=7\text{cm}$, then construct $\triangle AB'C' \sim \triangle ABC$ such that $AB'=7\text{cm}$
- Draw a $\triangle ABC, BC= 7\text{cm}, B=45^\circ, A = 105^\circ$, Construct a triangle whose sides are $\frac{4}{3}$ times the corresponding sides of $\triangle ABC$
- Construct tangent to a circle of radius 4cm a point P on the circle and take a point Q outside the circle at a distance of 6cm and draw tangents from that point

AREA RELATED TO CIRCLES

- The perimeter of a semicircle is 144cm, Find the radius of the semicircle.
- Find the area of the shaded region in the given figure if ABCD is square of side 14 cm and APD and BPC are semicircles

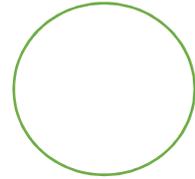


- In the given figure a square OABC is inscribed in a quadrant OPBQ . If $OA = 20\text{ cm}$ find the area of shaded region. ($\pi = 3.14$)



- In a circle of radius 21cm, an arc subtends an angle of 60° at the centre. Find
 - length of arc
 - area of sector formed by the arc
 - area of major and minor segment formed by corresponding chord

5 Find the area of the shaded region in the given figure where $PQ = 24$ cm , $PR = 7$ cm and O is centre of the circle.



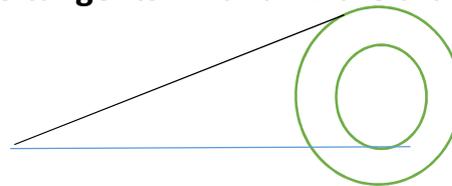
SURFACE AREA AND VOLUME

- 1 Three cubes each of volume 27cm^3 are joined in a row to form a cuboid .Find the total surface area of the resulting cuboid.
- 2 A solid wooden toy is in the shape of a right circular cone mounted on a hemisphere. If the radius of the hemisphere is 4.2 cm and the total height of the toy is 10.2 cm , find the total surface area of the wooden toy if the slant height of the conical portion is 7.3 cm.
- 3 A cylindrical jar of radius 6cm contains oil. Iron spheres, each of radius 1.5cm are immersed in the oil. How many spheres are necessary to raise the level of oil by 2 cm?
- 4 Metallic spheres of radii 6cm, 8cm and 10cm are melted to form a single solid sphere. Find the radius of the resulting sphere.
- 5 The height of a cone is 30cm.A small cone is cut off at the top by a plane parallel to the base. If its volume be $1/27$ of the given cone , at what height above the base is the cross section made?

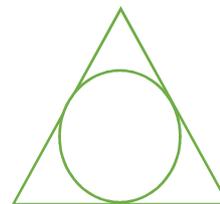
CIRCLES

1. Prove that angle between two tangents from an external point is supplementary to the angle subtended by lines joining the point of contact to the centre

2. In the given fig there are two concentric circles with centre O and of radius 3cm and 5cm. From an external point P , two tangents PA and PB are drawn, if $AP= 12$ cm, find BP .



3. In the given fig. $AB = AC$, Prove that $BE = EC$



4. Prove that the parallelogram-circumscribing circle is a rhombus

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

STATISTICS

1. The following distribution shows the daily pocket allowance of children in a locality. The mean pocket allowance is Rs. 18. Find the missing frequency.

DAILY POCKET ALLOWANCE	NO. OF CHILDREN
11-13	7
13-15	6
15-17	9
17-19	13
19-21	F
21-23	5
23-25	4

2. Find the Median marks of the students from the following table graphically and verify with Formula. Find the mode also

Marks	No. of Students
Above 0	80
Above 10	77
Above 20	72
Above 30	65
Above 40	55
Above 50	43
Above 60	23
Above 70	16
Above 80	10
Above 90	8
Above 100	0

3. If the Median of the distribution given below is 28.5, Find the value of X and Y :

class	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	Total
frequency	5	x	20	15	y	5	60

4. In the following distribution, how many families have income range (in Rs) 16000 – 19000.

Monthly Income	No. of families
More than 10000	100
More than 13000	85
More than 16000	69
More than 19000	50
More than 22000	33
More than 25000	15

Also, Draw an O-give for the above data and find median

PROBABILITY

1. Cards marked 3, 4, 550 are placed in a box and mixed thoroughly. One card is drawn at random from the box. Find the probability that number on the card drawn is

- i) Divisible by 7
- ii) A number which is a perfect square

2. 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 red king
- iii) Neither a king nor a queen
- iv) Either a king or a queen

3. Find the probability of getting 53 Sundays in a i) leap year ii) a non leap year

4. A dice is thrown twice what is the probability that

- i) 5 will come up atleast once
- ii) The sum of two numbers appearing on the dice is 8

5. The king ,the queen ,the jack and 10,all Of spades are lost from a pack of 52 playing cards .a card is drawn from the remaining well shuffled pack. Find the probability of getting a

- i) Red card
- ii) king
- iii) black card

6. Three coins are tossed once ,find the probability of getting

- i) Three heads
- ii) At least one head
- iii) No head