



Dakshina Kannada Zilla Panchayat

Department of Public Instruction

Office of Deputy Director of Public Instruction  
(Administration), Mangalore

and

District Institute of Education and Training  
Kodialbail, Mangalore, Dakshina Kannada

# Sopana

*For Achievement in Mathematics...*

## Mathematics Question Bank

(Resource material prepared during the S.S.L.C. Exam  
Preparation Programme 2021-22)

## **Foreword**

The global pandemic Covid-19 has had an adverse effect on the Educational System. At this juncture, I sincerely thank the resource persons who have prepared the Question Bank in Mathematics even during these testing times. I also thank the Staff of the DDPI Office Mangalore and the Lecturers of the DIET Mangalore who have extended their co-operation and guidance during the preparation of the Question Bank.

The 10 standard classes for the year 2021-22 have officially begun on September-2021 and as per the guidance of the Government 20% of the portion from the syllabus has been reduced and the teachers have completed the teaching of the portion from the reduced syllabus, on time. The Question Bank has been well prepared in order to benefit the students. This Question Bank is useful for the students, and hence every teacher should procure the copy of this book and reach it to every student and help them score their best marks. Wishing that everyone works in this regard and join hands in making Dakshina Stand First in the State.

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And all the Mathematics Teachers of Dakshina Kannada District

## Content

S.No.	Unit
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2.	Triangles
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8.	Quadratic Equations
9.	Introduction to Trigonometry
10.	Some applications of Trigonometry
11.	Statistics
12.	Surface Areas and Volumes

## 1. Arithmetic Progression

### Multiple choice questions :

- 1) In an arithmetic progression, if  $a_n=2n+1$ , then the common difference of the given progression is \_\_\_\_\_  
a) 0 b) 1 c) 2 d) 3
- 2) If the common difference of an A.P. is 5 then the value of  $a_{18}-a_{13}$  is \_\_\_\_\_  
a) 5 b) 20 c) 25 d) 30
- 3) The 10<sup>th</sup> term of an A.P. 5,9,13..... is \_\_\_\_\_  
a) 36 b) 31 c) 41 d) 21
- 4) If the n<sup>th</sup> term of an A.P. is  $4n^2-1$  then the 8<sup>th</sup> term is \_\_\_\_\_  
a) 32 b) 31 c) 256 d) 255
- 5) In an A.P. if  $s_1=5$  and  $s_2=12$  then value of d is \_\_\_\_\_  
a) -2 b) 1 c) 2 d) 3
- 6) If the n<sup>th</sup> term of an A.P. is  $a_n = 24-3n$  then its 2<sup>nd</sup> term is \_\_\_\_\_  
a) 18 b) 15 c) 0 d) 2
- 7) If the n<sup>th</sup> term of an A.P. is  $5n+3$ , then the 3<sup>rd</sup> term is \_\_\_\_\_  
a) 11 b) 18 c) 12 d) 13
- 8) In an A.P. n<sup>th</sup> term of an A.P. is  $a_n=2n-1$  then 5<sup>th</sup> term is \_\_\_\_\_  
a) 16 b) 9 c) 14 d) -14
- 9) If the first term of an A.P. is 3, common difference is 2 then its 20<sup>th</sup> term is \_\_\_\_\_  
a) 39 b) 41 c) 42 d) 43
- 10) If  $a_n=2n+3$  then the value of  $S_3$  is \_\_\_\_\_  
a) 15 b) 17 c) 21 d) 24
- 11) The sum of first n natural number is \_\_\_\_\_  
a)  $S_n = n^2$  b)  $S_n = \frac{n(n+1)}{2}$  c)  $S_n = n(n+1)$  d)  $S_n = \frac{n(n-1)}{2}$
- 12) Number of 2-digit numbers divisible by 3 is \_\_\_\_\_  
a) 30 b) 33 c) 29 d) 99
- 13) If 3,8,13 are in A.P. then the common difference is \_\_\_\_\_  
a) 19 b) 15 c) 11 d) 7
- 14) If  $(x+2), x$  and  $(2x+3)$  are in A.P. then the value of x is \_\_\_\_\_

- a) 6 b) -5 c) 5 d) 3
- 15) The sum of  $n$  odd natural numbers is \_\_\_\_\_  
 a)  $S_n = n^2$  b)  $S_n = n^3$  c)  $S_n = n(n-1)$  d)  $S_n = n(n+1)$
- 16) The sum of  $n$  even natural number is \_\_\_\_\_  
 a)  $S_n = n(n+1)$  b)  $S_n = n^3$  c)  $S_n = n(n-1)$  d)  $S_n = n^2$
- 17) Value of  $\sum 5$  is \_\_\_\_\_  
 a) 20 b) 15 c) 5 d) 25

**1 mark questions :**

- 1) Write the general form of an A.P.
- 2) Write the  $n^{\text{th}}$  term of an A.P.
- 3) If the first term of an A.P. is  $x$  and common difference is  $y$  then write the  $n^{\text{th}}$  term of A.P.
- 4) Find the  $10^{\text{th}}$  term of an A.P. 2,8,14.....
- 5) If the first term of an A.P. is  $a$  and last term is  $l$  then write the formula to find sum of  $n^{\text{th}}$  terms.
- 6) Find the first term and common difference of the given A.P. 3,1,-1,-3....
- 7) Write the formula to find the sum of  $n$  terms of an A.P.
- 8) What is the sum of first  $n$  positive integers?
- 9) Find the sum of first 10 positive integers.
- 10) What is the common difference of an A.P. where  $a_n = 3n-2$ ?
- 11) Find the  $9^{\text{th}}$  term of an A.P. whose  $n^{\text{th}}$  term is given  $a_n = 2n-5$
- 12) Find the  $10^{\text{th}}$  term of an A.P. whose  $n^{\text{th}}$  term is given  $a_n = 2n-5$
- 13) In an A.P. if  $a_n = n^2 + 4$  then find  $a_2$ .
- 14) In an A.P.  $a_n = n^2 + 3$  then find  $a_3$
- 15) Find the  $2^{\text{nd}}$  term of sequence where  $n^{\text{th}}$  term is  $\frac{n}{n+1}$

**2 marks**

- 1) Find the sum of even numbers between 1 and 100
- 2)  $x, 13, y$  and 3 are in A.P. Find the value of  $x$  and  $y$
- 3) How many two-digit numbers are divisible by 3?



- 4) How many two digit numbers are divisible by 7 ?
- 5) Find the sum of first 30 terms of the A.P.  $1+5+9+13+\dots$
- 6) Find the 50<sup>th</sup> term of the A.P.  $5,10,15,\dots$
- 7) Find the sum of  $5+8+11+\dots$  to 10 terms using the formula
- 8) What is the sum of the first 40 positive integers divisible by 6?
- 9) Find the sum of the first 15 multiples of 8
- 10) Find the sum of the odd numbers between 0 and 50
- 11) Find the sum of the even numbers between 0 and 50
- 12) The first term of an A.P. is 5, the last term is 45 and the sum is 400. Find the number of terms and the common difference.
- 13) Find the sum of first 22 terms of an A.P. in which  $d=7$  and 22<sup>nd</sup> term is 149.
- 14) How many terms of the A.P.  $24,21,18,\dots$  must be taken so that their sum is 78?
- 15) Find the sum of first 15 terms, whose  $n$ th term is given by  $a_n=3+2n$
- 16) Find the sum of first 15 terms of an A.P.  $4,7,10,\dots$
- 17) Find how many terms are there in an A.P.  $100,96,92,\dots$  12
- 18) Find the 30<sup>th</sup> term of an A.P.  $10,7,4,\dots$
- 19) Find 15<sup>th</sup> term of an A.P.  $2,7,12,\dots$
- 20) Which term of the A.P.  $3,8,13,\dots$  is 78?
- 21) Find the sum of the first 22 terms of an A.P.  $8,3,-2,\dots$
- 22) In an A.P. if  $a=7, d=3, n=8$  then find  $a_n$
- 23) In an A.P. if  $a=-18, n=10, a_n=0$  find  $d$
- 24) Find the sum of first 100 natural numbers
- 25) In an A.P.  $a_{12}=37, d=3$  find  $a$  and  $S_{12}$ .
- 26) How many three-digit numbers are divisible by 7?

**3 marks /4 marks**

- 1) Determine the A.P. whose third term is 16 and the 7<sup>th</sup> term exceeds the 5<sup>th</sup> term by 12.
- 2) The sum of 4<sup>th</sup> and 8<sup>th</sup> terms of an A.P. is 24 and the sum of 6<sup>th</sup> and 10<sup>th</sup> term is 44 Find the first three terms of the A.P.
- 3) Find the 31<sup>st</sup> term of an A.P. whose 11<sup>th</sup> term is 38 and 16<sup>th</sup> term is 73. Also find the sum of 10 terms of the A.P.

- 4) The seventh term of an A.P. is 4 times the 2<sup>nd</sup> term and twelfth term is 2 more than three times the 4<sup>th</sup> term. Find the Arithmetic Progression.
- 5) A line segment is divided into four parts forming an A.P. The sum of the lengths of 3<sup>rd</sup> and 4<sup>th</sup> parts is 3 times the sum of the lengths of first 2 parts. If the length of fourth part is 14cm. Find the total length of the line segment.
- 6) The first term of two A.P.s are equal and the ratios of their common differences is 1:2. If the 7<sup>th</sup> term of first A.P. and 21<sup>st</sup> term of 2<sup>nd</sup> A.P. are 23 and 125 respectively. Find two A.P.s.
- 7) In an A.P. 3<sup>rd</sup> term is 7 and the 7<sup>th</sup> term is 2 more than three times the third term. Find the sum of first 20 terms of the A.P.
- 8) Tenth term of an A.P. is 21 and the sum of the first 10 terms is 120. Find the 20<sup>th</sup> term of the A.P.
- 9) The sum of first 6 terms of an A.P. is 42 The 10<sup>th</sup> term and 30<sup>th</sup> term are in the ratio 1:2 Find the 13<sup>th</sup> term of the A.P.
- 10) In an A.P. the sum of four terms is 20 and the sum of their squares is 120. Find the four terms.
- 11) The number of mobile telephones manufactured by a new company increases every month by a constant number. If the company manufactures 600 mobiles in 3<sup>rd</sup> month and 1600 mobiles in the 7<sup>th</sup> month. Find the total product in the first year.
- 12) In an AP. if the 2<sup>nd</sup> and 3<sup>rd</sup> terms are 14 and 18 respectively. Find the sum of first 51 terms
- 13) If 12<sup>th</sup> and 22<sup>nd</sup> terms of an A.P. are 42 and 62 respectively. Find the 25<sup>th</sup> term.
- 14) Three angles of a triangle are in an A.P. If the largest angle is 75 find the remaining angles.
- 15) In an AP. the 3<sup>rd</sup> and 7<sup>th</sup> terms are 14 and -2 respectively which term of the A.P. is -14
- 16) The fourth term of an A.P. is 10 If 11<sup>th</sup> term is one more than three times the fourth term. Find the sum of its 25<sup>th</sup> term.
- 17) The sum of 2<sup>nd</sup> and 5<sup>th</sup> terms of an A.P. is 23. The difference of 3<sup>rd</sup> term and 10<sup>th</sup> term is 21 Find to terms of the A.P.
- 18) The third term of an A.P. is 8 if 9<sup>th</sup> term is two more than the three times of 3<sup>rd</sup> term find the sum of its 19 term
- 19) The sum of first 9 terms of an A.P. is 81 and the sum of first 15 terms is 225. Find the sum of first 20 terms

- 20) The thirteenth term of an A.P. is two times its 10<sup>th</sup> term and the third term is 6 more than two times its sixth term. Find the first three terms.
- 21) 3<sup>rd</sup> term of an A.P. exceeds the first term by 12. If the last term is 205 and the 5<sup>th</sup> term is 25 .Find the number of terms of the A.P.
- 22) An A.P. having four terms whose sum equal to 68 and the product of its middle two terms is 280. Find these four terms.
- 23) Subba Rao started work in 2015 at an annual salary of Rs.50,000 and received an increment of Rs.2000 each year. In which year did his income reach Rs.70,000?
- 24) There are 5 terms in an A.P. the sum of these terms is 55 and the 4<sup>th</sup> term is five more than the sum of the first two terms .Find the terms of A.P.
- 25) Find three consecutive terms which are in A.P. whose sum is 27 and product is 648.

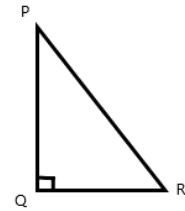
**5 marks**

- 1) In an A.P. m<sup>th</sup> term is n and n<sup>th</sup> term is m then find the sum of (m+n)<sup>th</sup> term.
- 2) The ratio of the sums of m and n terms of an A.P. is  $m^2:n^2$  . Show that the ratio of the m<sup>th</sup> and n<sup>th</sup> terms is (2m-1):(2n-1)
- 3) In an A.P. 6<sup>th</sup> term is one more than twice the third term. The sum of 4<sup>th</sup> and 5<sup>th</sup> terms is 5 times the 2<sup>nd</sup> term. Find the 10<sup>th</sup> term of the A.P. and sum of 10 terms of A.P.
- 4) The sum of first 3 terms of an A.P is 24 and the sum of their square is 224 Find the first 3 terms of A.P.
- 5) The sum of four consecutive terms which are in an A.P. 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 number.

## 2. Triangles

### 1 MARKS

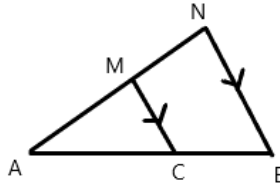
- 1) State Basic proportionality theorem.
- 2) State the converse of Thales theorem.
- 3) State the Pythagoras theorem
- 4) State the converse of Pythagoras theorem.
- 5) State equiangular triangles
- 6) State similarity of triangles.
- 7) Define similar figures.
- 8) In  $\Delta ABC$   $\angle B = 90^\circ$   $AC=17$  cm ,  $AB = 8$ cm Find the length of BC.
- 9) In the given figure  $\angle Q = 90^\circ$ . Apply the Pythagoras Theorem and write the equation.



- 10) Give an example for Pythagorean triplet.

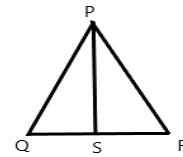
### MCQ 1 marks

- 1) Sides of two similar triangles are in the ratio 4:9. Areas of these triangles are in the ratio \_\_\_\_\_  
a) 2:3      b) 4:9      c) 81:16      d) 16:81
- 2) If the areas of two triangles are in the ratio 81:16 then the ratios of their corresponding sides are \_\_\_\_\_  
a) 9:4      b) 4:9      c) 2:3      d) 16:81
- 3) Sides of a triangle are given below. Determine which of them is a right angled triangle \_\_\_\_\_  
a) 2,3,5      b) 6,8,10      c) 8,4,6      d) 6,8,9
- 4) In the given figure  $\Delta ABN \sim \Delta AMC$  of AM and AN's ratio is 2:5. Find CM:BN  
a) 5:2      b) 2:5      c) 1:2      d) 2:3



- 5) A person of height 6m, casts a shadow 8m long on the ground and at the same time a tower casts a shadow 28m long. Find the height of the tower.  
 a) 42m    b) 40cm    c) 21m    d) 16cm
- 6) In  $\triangle ABC$ ,  $DE \parallel AB$ . If  $CD=3\text{cm}$ ,  $EC=4\text{cm}$ ,  $BE = 6\text{cm}$  then  $DA$  is equal to  
 a) 7.5cm    b) 3cm    c) 4.5cm    d) 6cm
- 7) In  $\triangle ABC$ ,  $\angle BAC = 90^\circ$  and  $AD \perp BC$  then  
 a)  $BD \cdot CD = BC^2$     b)  $AB \cdot AC = BC^2$     c)  $BD \cdot CD = AD^2$     d)  $AB \cdot AC = AD^2$

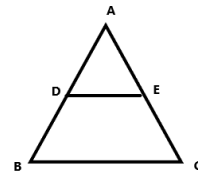
- 8) In triangle PQR, if  $PQ = 6\text{cm}$ ,  $PR=8\text{cm}$ ,  $QS=3\text{cm}$  and  $PS$  is the bisector of angle QPR, what is the length of  $SR$ ?



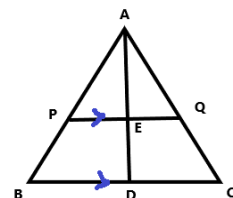
- a) 2    b) 4    c) 6    d) 8
- 9) A flag pole 8m high casts a shadow 6m long. Find the distance of the top of the pole from the far end of the shadow.  
 a) 10m    b) 9m    c) 8m    d) 6m
- 10) Which of the following is not a Pythagorean triplet?  
 a) 3,4,5    b) 6,8,10    c) 5,12,13    d) 30,80,89

**2 marks**

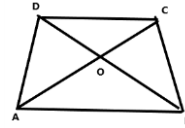
- 1) In fig.  $DE \parallel BC$ ,  $BD = 7\text{cm}$ ,  $AD=5\text{cm}$  and  $AC=18\text{cm}$  Find  $AE$  and  $CE$ .



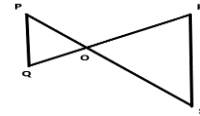
- 2) In  $\triangle ABC$  if  $PQ \parallel BC$  and  $BD=DC$  then prove  $PE=EQ$ .



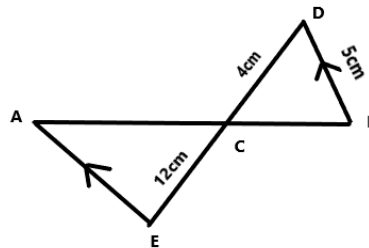
- 3) In trapezium ABCD  $AB \parallel DC$ ,  $AB=2CD$   
 $\Delta AOB=84\text{sq.cm}$ . Find the area of  $\Delta COD$ .



- 4) In fig. if  $PQ \parallel RS$  Prove that  $\Delta POQ \sim \Delta SOR$ .

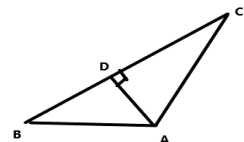


- 5) Let  $\Delta ABC \sim \Delta DEF$  and their areas be respectively  $64\text{cm}^2$  and  $121\text{cm}^2$ .  
 If  $EF = 11\text{cm}$  find  $BC$ .
- 6) Diagonals of a trapezium ABCD with  $AB \parallel DC$  intersect each other at the point O. If  $AB = 2CD$  find the ratio of the areas of triangles AOB and COD.
- 7) ABC is an isosceles triangle right angle at C. Prove that  $AB^2 = 2AC^2$
- 8) A guy wire attached to a vertical pole of height 18m is 24m long and has a stake attached to the other end. How far from the base of the pole should the stake be driven so that the wire will be taut?
- 9) ABC is an isosceles triangle with  $AC=BC$  If  $AB^2 = 2AC^2$  prove that ABC is a right triangle.
- 10) In the fig. if  $AE \parallel DB$ ,  $CD = 4\text{cm}$   $CE = 12\text{cm}$  and  $BD = 5\text{cm}$  find  $AE$ .



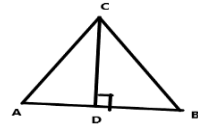
### 3 marks

- 1) From airport two airplanes start at the same time. If the speed of first airplane due North is  $1000\text{km/h}$  and that of other due East is  $1200\text{km/h}$ , then find the distance between two airplanes after 2 hours.
- 2) In the figure ABC is a triangle and  $AD \perp AC$ .  
 Prove that  $AB^2 + CD^2 = BD^2 + AC^2$ .



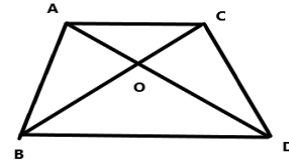
- 3) In  $\triangle ABC$  D,E and F are the midpoints of the sides AB ,BC and AC respectively .  
Find the ratio of area of  $\triangle ABC$  and area of  $\triangle DEF$ .

- 4) In fig.  $\angle ACB = 90^\circ$  and  $CD \perp AB$ . Prove that  $\frac{BC^2}{AC^2} = \frac{BD}{AD}$



- 5) In fig ABC and DBC are two triangles on the same base BC. If AD intersects BC at O Show that

$$\frac{\text{ar}(\triangle ABC)}{\text{ar}(\triangle DBC)} = \frac{AO}{DO}$$

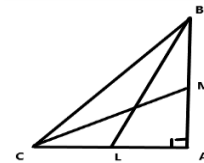


- 6) Prove that the ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding medians .  
7) Two poles of heights 6m and 11m stand on a plane ground. If the distance between the feet of the poles is 12m find the distance between their tops.

#### 4 marks

- 1) State and prove Thales theorem.
- 2) State and prove Pythagoras theorem.
- 3) Prove the ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding sides.
- 4) State and prove Angle-Angle-Angle criterion for similarity of two triangles.
- 5) BL and CM are medians of a triangle ABC right angled at A.

Prove that  $4(BL^2 + CM^2) = 5BC^2$



- 6) In an equilateral triangle ABC, D is a point on side BC such that  $BD = \frac{1}{3} BC$ . Prove that  $9AD^2 = 7AB^2$

### 3. Pair of Linear Equations in Two Variables

#### 1 MARKS

- 1) Write the general form of linear equation in one variable.
- 2) Write the general form of linear equation in two variables.
- 3) Write the value of a,b and c in the following linear equation  $2x+3y=7$ .
- 4) Find whether the following pair of linear equations are consistent or inconsistent  
 $x-2y=0$  and  $3x+4y-20=0$
- 5) Find whether the lines representing the following pairs of linear equations intersect at a point, are parallel or coincident  
 $9x-3y+12=0$  and  $18x+6y+24=0$
- 6) The larger of two supplementary angles exceeds the smaller by  $28^\circ$ . Represent the situation algebraically.
- 7) Find the number of solutions for the following linear equations  
 $x+y=3$  and  $5x-5y=1$
- 8) If the following pair of lines are parallel, find the value of k  
 $3x+2ky-2=0$  and  $2x+5y+1=0$
- 9) Find the value of x and y for the following pair of linear equations  
 $x-y=2$   
 $x+y=4$
- 10) If  $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$  of a pair of linear equations. Write the number of solutions.

#### 2 marks

- 1) Solve the following pair of linear equations
  - a)  $3x+5y=4$
  - b)  $2x+y=8$
  - c)  $2x+y=8$ $x-5y=8$                        $x+y=5$                        $x+2y=7$
- 2) For what values of k will the following pair of linear equations have infinitely many solutions?  
 $kx+3y-(k-3)=0$   
 $12x+ky-k=0$
- 3) The difference between two numbers is 36 and one number is three times the other represent the situation algebraically



**3 marks**

- 1) If we add 1 to the numerator and subtract 1 from the denominator, a fraction reduces to 1. It becomes  $\frac{1}{2}$  if we add 1 to the denominator, what is the fraction?
- 2) The area of a rectangle gets reduced by 9 square unit 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.

**4 marks**

- 1) Solve graphically

a) $x+y=8$ $x-y=2$	b) $3x+4y=10$ $2x-2y=2$	c) $3x+2y=0$ $x+3y=7$	d) $2x+3y=6$ $x+y=3$
e) $3x+4y=12$ $x-y=5$	f) $3x+5y=15$ $x+y=3$	g) $2x+3y=6$ $3x+4y=12$	h) $2x+y=8$ $x+4y=8$

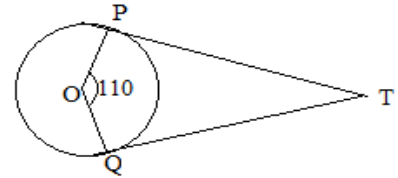
## 4. Circles

### Multiple Choice Questions

1. In the adjoining figure TP and TQ are the tangents to the circle with centre O the measurement of  $\angle PTQ$  is

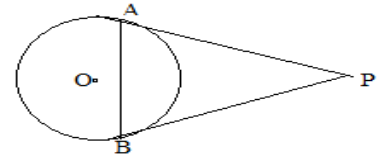
\_\_\_\_\_

- a)  $90^\circ$     b)  $110^\circ$     c)  $70^\circ$     d)  $140^\circ$



2. In the figure if PA and PB are tangents and  $AP=AB$  then  $\angle APB$  is \_\_\_\_\_

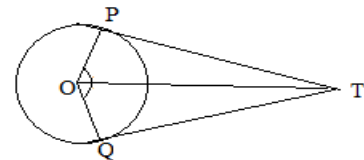
- a)  $90^\circ$     b)  $60^\circ$     c)  $180^\circ$     d)  $70^\circ$



3. In the  $\angle PTQ = 80^\circ$  then Type equation here. POT is

\_\_\_\_\_

- a)  $100^\circ$     b)  $40^\circ$     c)  $80^\circ$     d)  $50^\circ$



4. The distance between two parallel tangents of a circle of radius 4 cm is \_\_\_\_\_

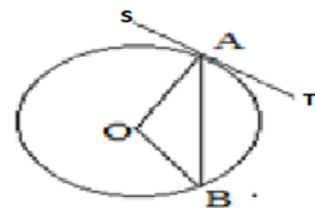
- a) 2 cm    b) 4 cm    c) 6 cm    d) 8 cm

5. A tangent is drawn from a point at a distance of 17 cms of circle C of radius 8 cm. It's length is \_\_\_\_\_

- a) 5 cm    b) 9 cm    c) 15cm    d) 23 cm

### One Mark Questions

1. In the given figure, O is the centre of a circle AB is a chord and ST is the tangent at A. It  $\angle AOB = 100^\circ$  then calculate  $\angle BAT$



2. How many tangents can be drawn from an external point to the circle?
3. How many parallel tangents can be drawn to a circle at the most?
4. If the perimeter and the area of a circle are numerically equal, then find the radius of the circle.
5. Write the angle between the radius and the tangent drawn at the end point of the radius.

**Two marks Questions**

1. Prove that the tangents drawn at the ends of a diameter of a circle are parallel.
2. Two concentric circles are of radius 5 cm and 3 cm. Find the length of the chord of the larger circle which touches the smallest circle.

**Three Marks Questions**

1. Prove that “The length of tangents drawn from an external point to a circle are equal”
2. Prove that “The tangents at any point of the circle is perpendicular to the radius through the point of contact.”

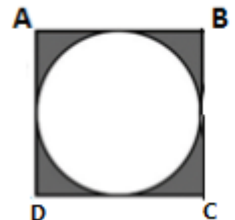
## 5. Areas Related to Circles

### One Mark Questions

- 1) What is the formula to find the circumference of a circle?
- 2) What is the formula to find the Area of a circle?
- 3) What is a sector?
- 4) What is a segment?
- 5) What is the area of the sector with angle  $\theta$  and radius 'r'?
- 6) What is the formula to find the length of the arc of a sector with angle  $\theta$  and radius 'r'?
- 7) If the circumference and area of a circle are numerically equal then what is the radius of that circle?
- 8) What is formula to find the area of a square?
- 9) What is the formula to find the area of an equilateral triangle?
- 10) What is formula to find the area of a rectangle?
- 11) What is the formula to find the area of a triangle?

### One Mark Questions (Multiple Choice Questions)

- 1) If the area of a sector of a circle is  $\frac{5}{9}$  times the area of the circle, then the angle of the sector \_\_\_\_\_  
A)  $100^\circ$     B)  $200^\circ$     C)  $50^\circ$     D)  $150^\circ$
- 2) If the ratio of the radii of two circles is 3 : 2 then the ratio of their areas is \_\_\_\_\_  
A) 3 : 4    B) 4 : 9    C) 9 : 4    D) 27 : 8
- 3) If the area of a circle is  $154 \text{ cm}^2$  then the length of its radius is \_\_\_\_\_  
A) 14cm    B) 21cm    C) 28cm    D) 7cm
- 4) The area of the biggest square that can be circumscribed inside a circle with radius 6cm \_\_\_\_\_  
A)  $72 \text{ cm}^2$     B)  $74 \text{ cm}^2$     C)  $36 \text{ cm}^2$     D)  $120 \text{ cm}^2$
- 5) A circle is circumscribed inside a square as shown in the figure. If the length of the side of the square is 14 cm, then the area of the shaded region is \_\_\_\_\_  
A)  $21 \text{ cm}^2$     B)  $42 \text{ cm}^2$     C)  $48 \text{ cm}^2$     D)  $196 \text{ cm}^2$

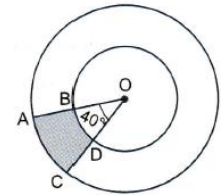


- 6) The circumference of a circle and the perimeter of a square are equal. If the area of the square is  $484 \text{ cm}^2$  then the diameter of the circle is \_\_\_\_\_
- A) 14cm    B) 21cm    C) 28cm    D) 7cm

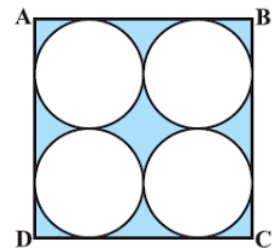
**Two marks Questions**

- 1) Find the area of the sector whose radius is 4 cm and the angle subtended at the centre is  $30^\circ$
- 2) Find the area of the sector whose diameter is 6 cm and the angle subtended by the arc at the centre of the circle is  $60^\circ$

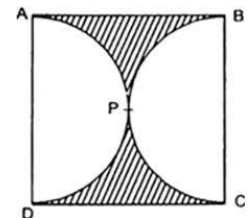
- 3) Find the area of the shaded region in the given figure, if radii of two concentric circles with centre O are 7 cm and 14 cm respectively and  $\angle AOC = 40^\circ$ .



- 4) If ABCD is a square with sides equal to 14 cm then find the area of the shaded region in the given figure.



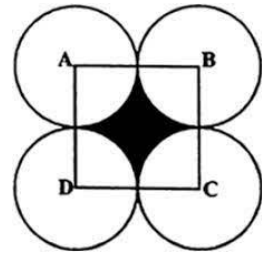
- 5) ABCD is square with sides 14 cm. If APD and BPC are semicircles as shown in the figure, then find the area of the shaded region.



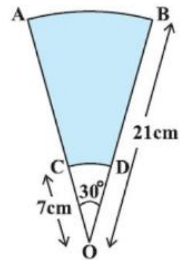
- 6) Find the area of the shaded region in the given figure.



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



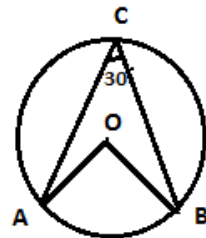
- 8) AB and CD are respectively the arcs of two concentric circles of radii 21 cm and 7 cm and centre O . If  $\angle AOB = 30^\circ$ , find the area of the shaded region. 'O'



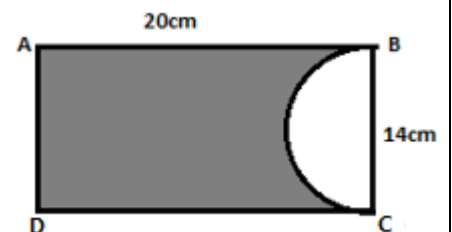
### Three marks Questions

- 1) In a circle of radius 21 cm, an arc subtends an angle of  $60^\circ$  at the centre. Find the length of the arc and the area of the sector formed by the arc.

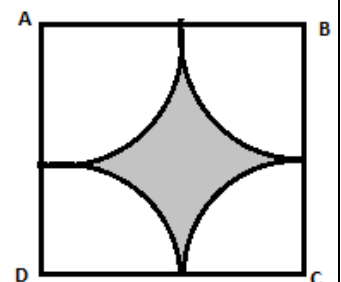
- 2) 'O' is the centre of the circle whose radius is 6cm. What is the area of the sector AOB?



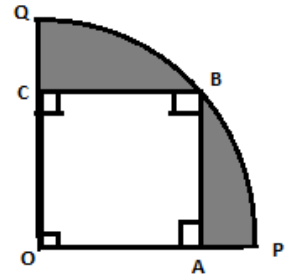
- 3) A sheet of paper ABCD is in the shape of a rectangle.  $AB = 20\text{cm}$ ,  $BC = 14\text{cm}$ . A semicircle is cut out from it with BC as the diameter. Find the area of the remaining part.



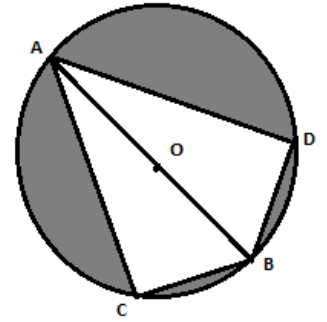
- 4) What is the area of the remaining portion of a square shaped sheet of paper whose sides are of length 24cm, when four congruent quadrants are cut out from its four vertices as shown in the figure?



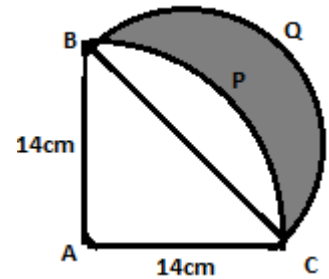
- 5) A square OABC is inscribed in a quadrant OPQ. If  $OA = 14$  cm, find the area of the shaded region.



- 6) In the figure, if 'O' is the centre of the circle and  $BC = BD = 8$  cm  $AC = AD = 15$  cm then what is the area of the shaded region?



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



## 6. Constructions

### Two marks Questions

1. Draw a line segment of length 10 cms and divide it in the ratio 3:2. Measure the two parts
2. Draw a circle of radius 3.5 cms. From a point 8cm away from its centre, construct the pair of tangents to the circle and measure their length.
3. Draw a circle of radius 4cms and construct a pair of tangents to the circle from a point 5cms away from the circle.
4. Draw a pair of tangents to a circle of radius 5cm which are inclined to each other at angle of  $60^{\circ}$ .
5. Draw a circle of radius 4cm. Construct a pair of tangents to the circle such that angle between the radii  $70^{\circ}$ .
6. Construct a tangent to a circle of radius 4cm at any point P on its circumference.
7. Draw a pair of tangents to a circle of radius 4cm which are inclined to each other at an angle of  $70^{\circ}$  and write the measure of its length.
8. Draw a line segment of AB=8cm and divide it in the ratio 5:3 by geometrical construction.

### Three Marks Questions

1. Construct a triangle with sides 5cms, 6cms and 7cms and then draw a similar triangle whose sides are in the ratio  $\frac{7}{5}$  of the corresponding sides of the first triangle.
2. Construct a triangle of sides 4cms, 5cms and 6cms and then a triangle similar to it whose sides are  $\frac{2}{3}$  of the corresponding sides of the first triangle.
3. Construct a triangle ABC of its sides BC=4cm, AB=6cm and AC=4.5cm then construct a triangle similar to it, whose sides are  $\frac{5}{3}$  of the corresponding sides of the triangle ABC.
4. Construct a triangle ABC of its sides BC=4cm, AB=6cm and AC=5cm then construct a triangle similar to it, whose sides are  $\frac{3}{5}$  of the corresponding sides of the triangle ABC.
5. Construct a right-angled triangle with sides other than the hypotenuse 5cms and 6 cms each and then construct triangle similar to it whose sides are  $\frac{2}{3}$  of its corresponding sides.



## 7.Coordinate Geometry

### 1 MARKS

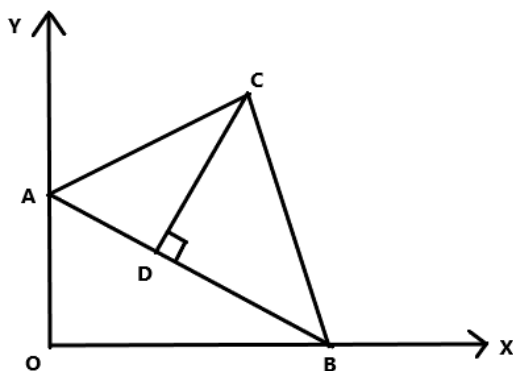
1. Write the formula to find the distance of the point  $P(x,y)$  from the origin.
2. Write the formula to find the distance between any two points  $P(x_1,y_1)$  and  $Q(x_2,y_2)$
3. Write the Mid-point formula.
4. Write the section formula.
5. Write the formula to find the area of a triangle whose vertices are  $(x_1,y_1)$ ,  $(x_2,y_2)$  and  $(x_3,y_3)$
6. What is the distance of point  $(3,4)$  from the origin?
7. Find the distance of point  $(-6,8)$  from the origin ?
8. Find the distance between the points  $(2,3)$  and  $(6,6)$  ?
9. Find the distance between the points  $(2,3)$  and  $(-3,-7)$  ?
10. Find the mid - point of the line segment joining the points  $(5,3)$  and  $(1,-1)$  ?
11. Find the mid-point of the line segment joining the points  $(4,7)$  and  $(2,-3)$  ?
12. What is the area of triangle whose vertices are collinear?
13. If area of triangle is zero then the vertices of triangle are\_\_\_\_\_.

### 2 marks

- 1) Find the coordinates of the point which divides line segment joining the points  $(4,-3)$  and  $(8,5)$  in the ratio 3:1 internally?
- 2) Find the value of 'y' for which distance between the points  $P(2,-3)$  and  $Q(10,y)$  is 10 units ?
- 3) In what ratio does the points  $(-4,6)$  divide the line segment joining the points  $A(-6,10)$  and  $B(3,-8)$
- 4) 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
- 5) Do the points  $(3,2)$ ,  $(-2,-3)$  and  $(2,3)$  form a triangle? If so, name the type of the triangle formed.

**3 marks**

1. Find the area of a triangle whose vertices are  $(1,-1)$ ,  $(-4,6)$  and  $(-3,-5)$
2. Find the value of  $k$  if the points  $A(2,3)$ ,  $B(4,k)$  and  $C(6,-3)$  are collinear
3. Find the area of triangle formed by the points  $A(5,2)$ ,  $B(4,7)$  and  $C(7,-4)$
4. If  $A(-5,7)$ ,  $B(-4,-5)$  and  $C(-1,-6)$  and  $D(4,5)$  are the vertices of a quadrilateral. Find the area of quadrilateral.
5. Find the area of a triangle whose vertices are  $P(2,3)$ ,  $Q(4,0)$  and  $R(6,-3)$
6. Check whether  $A(8,-4)$ ,  $B(9,5)$  and  $C(0,4)$  are the vertices of an isosceles triangle ?
7. In the given fig. the vertices of a  $\triangle ABC$  are  $A(0,6)$ ,  $B(8,0)$  and  $C(5,8)$ .  $CD \perp AB$ . Find the height  $CD$  of  $\triangle ABC$



8. The vertices of a triangle  $ABC$  are  $A(-3,2)$ ,  $B(-1,-4)$  and  $C(-5,2)$ . If  $M$  and  $N$  are the mid-points of  $AB$  and  $AC$  respectively show that  $2MN=BC$
9. The vertices of  $\triangle ABC$  are  $A(-5,-1)$ ,  $B(3,-5)$ ,  $C(5,2)$  show that the area of the  $\triangle ABC$  is four times the area of the triangle formed by joining the mid-points of the sides of the triangle  $ABC$ .

## 8. Quadratic Equation

### One Mark Questions

1. Write the general form of quadratic equations.
2. Write the discriminant of the quadratic equation
3. If  $b^2-4ac = 0$  find the nature of the root
4. If  $b^2-4ac > 0$  write the nature of the root
5. If  $b^2-4ac < 0$  find the nature of the root
6. Write the formula to find the roots of the quadratic equation
7. Write the discriminant of the quadratic equation  $ax^2+c=0$
8. If the root of the equation  $(x+4)(x+3) = 0$  is -4 then find the other root of the equation
9. Write the quadratic equation having roots 2 and -2.
10. Write the quadratic equation having roots 2 and -3
11. If the product of two consecutive positive odd numbers is 35 then the quadratic equation of this statement is \_\_\_\_\_
12. If  $(x-2)^2=25$  then find the value of 'x'
13. Write given equation in the standard form  $x+\frac{1}{x}=5$
14. If the roots of the quadratic equation are real and distinct what is the value of the discriminant?
15. Which of the following is a quadratic equation?  
a)  $x(x+1)(x+2)$     b)  $x+\frac{1}{x}=5$     c)  $2x+3=4$     d)  $x^2+y=5$
16. If the quadratic equation  $x^2+kx+64=0$  has equal roots then the value of 'k' is \_\_\_\_\_  
a) 4    b) 8    c) 12    d) 16
17. Write the discriminant of the quadratic equation  $px^2+qx+r=0$

### Two marks questions

1. Find the roots of the quadratic equation using formula
  - a)  $x^2+5x+6=0$
  - b)  $2x^2 = x-5$
  - c)  $5x^2 - 3 = 0$
  - d)  $2x^2 - x = 3$
  - e)  $x - \frac{1}{x} = 3$
  - f)  $2p^2+7p+3=0$
  - g)  $2m^2-m-4 = 0$
  - h)  $4y^2 + 4\sqrt{3}x + 4 = 0$
  - i)  $2p^2 -6q +3 = 0$
  - j)  $\frac{1}{y} - \frac{1}{y^2} = 3$

2. Write the nature of the roots for the following quadratic equation

a)  $x^2-x+12=0$

c)  $x^2-5x+1=0$

e)  $x^2-6x=-4$

b)  $x^2-4x+4=0$

d)  $2x^2=8x-6$

f)  $(x-3)^2 = 4$

3. Find the value of 'k' for each of the following quadratic equation so that they have two equal roots

a)  $4x^2-2(k+1)x+(k+1)=0$

b)  $x^2-(k+1)x +9 =0$

c)  $x^2-6x+(k-2)=0$

d)  $kx^2-10x+1=0$

4. The product of two consecutive positive integers is 240. Find those numbers

5. If the sum of the number and its reciprocal is  $\frac{26}{5}$ . Find the numbers

6. If the two sides of the right angled triangle are  $(x+3)$  and  $(x+1)$  and its hypotenuse is 100 Find the value of 'x'

7. The height of the right-angled triangle is 7 cm less than its base and its hypotenuse is 13 cm. Find its base

8. If the two sides of the rectangle are  $(x+3)$  and  $(x+2)$  its area is  $30 \text{ cm}^2$ . Find those sides

9. In a triangle the length of the base and the height are  $(x+1)$  and  $(x+5)$  respectively. Its area is  $30 \text{ cm}^2$ . Find the value of 'x'

10. The sum of the squares of two consecutive integers is 41. Find the numbers.

11. Find the side of the square whose area is  $144 \text{ cm}^2$

12. Find the area of an equilateral triangle is  $4\sqrt{3} \text{ cm}^2$ . Find the height.

13. Solve using the formula:  $q^2x^2+(q^2-p^2)x-p^2=0$

### Three marks questions

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

2. Mohan's mother is 26 years older than him. The product of their ages (in years) is 3 years from now will be 360. What is Mohan's present age.

3. A train travels a distance of 480 km at a uniform speed. If the speed had been 8km/hr. less then it would have taken 3 hours more to cover the same distance. Find the speed of the train.
4. Solve  $\frac{1}{x} - \frac{1}{x-2} = 3$
5. If the roots of the equation  $(a^2+b^2)x^2 + 2(bc-ad)x+c^2+d^2=0$  are real and equal. Show that  $ac+bd=0$  .
6. If twice the area of a smaller square is subtracted from the area of a larger square is equal to  $14\text{cm}^2$ . However, if twice the area of the larger square is added to 3 times the area of the smaller square the result is  $203\text{ cm}^2$ . Determine the side of the two squares.
7. The radius of the circle is  $3x+4$  its area is  $54\text{ cm}^2$ . Find the value of 'x' and hence the radius of the circle.
8. The numerator of a fraction is 3 less than its denominator. If 2 is added to both the numeration and the denominator, then the sum of the new fraction and original fraction is  $\frac{29}{20}$  Find the original fraction.
9. The speed of the boat in still water is 15km/hr it goes 3km/hr. upstream and returns downstream to the original point in 4 hours 30 minutes. Find the speed of the stream.
10. Students of a school arranged a picnic. Total cost of the food Rs. 2250. If 5 students were less, the food contribution for each will be Rs. 5 less. Find the total number of students who participated in the picnic.

## 9.Introduction to Trigonometry

### I. Choose the correct answers

1.  $\sin A = \frac{3}{4}$  then  $\operatorname{cosec} A =$  \_\_\_\_\_  
a)  $\frac{5}{3}$    b)  $\frac{4}{3}$    c)  $\frac{3}{5}$    d) None of the above
2. If  $\tan A = \frac{4}{3}$  then  $\sec A =$  \_\_\_\_\_  
a)  $\frac{5}{4}$    b)  $\frac{3}{4}$    c)  $\frac{4}{5}$    d)  $\frac{5}{3}$
3. The value of  $\cos 45^\circ$  \_\_\_\_\_  
a) 1   b)  $\frac{\sqrt{3}}{2}$    c)  $\frac{1}{\sqrt{2}}$    d)  $\frac{2}{\sqrt{3}}$
4. The value of  $\frac{\sin 18^\circ}{\cos 72^\circ}$  \_\_\_\_\_  
a) 1   b) 0   c) 2   d) None of the above
5. The value of  $\operatorname{Cosec} 31^\circ - \sec 59^\circ$  is \_\_\_\_\_  
a) 1   b) 2   c) 0   d) None of the above
6. If  $2\cos\theta = 1$  and  $\theta$  is an acute angle then the value of  $\theta$  is \_\_\_\_\_  
a)  $0^\circ$    b)  $30^\circ$    c)  $45^\circ$    d)  $60^\circ$
7.  $\sin A \cdot \cos A \cdot \tan A + \cos A \cdot \sin A \cdot \cot A$  is equivalent to \_\_\_\_\_  
a)  $\sin^2 A - \cos^2 A$    b)  $\tan^2 A + \cot^2 A$    c)  $\sin^2 A + \cos^2 A$    d)  $\sin^2 A + \tan^2 A$
8. If  $13\sin\theta = 5$  then the value of  $\tan\theta$  is \_\_\_\_\_  
a)  $\frac{5}{12}$    b)  $\frac{12}{5}$    c)  $\frac{12}{13}$    d)  $\frac{5}{13}$

### II. One Mark Questions

1. Find the value of  $\sin 30^\circ + \tan 45^\circ$
2. Find the value of  $\cos \theta \times \sec \theta$
3. If  $\sqrt{3}\cot \theta = 1$  then find the value of acute angle  $\theta$
4. Find the value of  $\frac{1 - \tan 45^\circ}{1 + \tan 45^\circ}$

5. Find the value of  $\cot 23^\circ \cdot \tan 67^\circ$

6. Find the value of  $\frac{2 \tan 30^\circ}{1 + \tan^2 30^\circ}$

### III. Two marks Questions

1. If  $\tan 2A = \cot (A - 18^\circ)$  where  $2A$  is an acute angle, find the value of  $A$

2. If  $\tan A = \cot B$  prove that  $A + B = 90^\circ$

3. Evaluate  $\frac{\sin^2 63^\circ + \sin^2 27^\circ}{\cos^2 17^\circ + \cos^2 73^\circ}$

4. Prove that  $(\tan A \times \sin A) + \cos A = \sec A$

5. If  $\cos \theta = 0.6$  then prove that  $5 \sin \theta - 3 \tan \theta = 0$  (Hint :  $0.6 = \frac{6}{10}$ )

6. Show that  $\cos 38^\circ \cdot \cos 52^\circ - \sin 38^\circ \sin 52^\circ = 0$

7. If  $A = 60^\circ$   $B = 30^\circ$  then prove that  $\tan(A - B) = \frac{\tan A - \tan B}{1 + \tan A \tan B}$

8. Prove that  $2 \cos^2 \theta - 1 = \cos^2 \theta - \sin^2 \theta$

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

10. If  $\cot A = \frac{12}{5}$  then find the value of  $(\sin A + \cos A) \sec A$

### IV. Prove the following (3 marks questions)

1.  $\sec A (1 - \sin A) (\sec A + \tan A) = 1$

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

3. If  $\tan(A + B) = \sqrt{3}$  and  $\tan(A - B) = \frac{1}{\sqrt{3}}$  ;  $0^\circ < (A + B) \leq 90^\circ$  ;

$A > B$  find  $A$  and  $B$

4.  $\frac{\sin(90 - \theta)}{1 + \sin \theta} + \frac{\cos \theta}{1 - \cos(90 - \theta)} = 2 \sec \theta$

5.  $\sqrt{\frac{1 + \sin A}{1 - \sin A}} = \sec A + \tan A$

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

7.  $\frac{\sin \theta}{1 + \cos \theta} + \frac{1 + \cos \theta}{\sin \theta} = 2 \operatorname{cosec} \theta$

8.  $(\sin A + \operatorname{cosec} A)^2 + (\cos A + \sec A)^2 = 7 + \tan^2 A + \cot^2 A$

V. Prove the following (4 Marks)

$$1. \frac{\sin(90-A)}{1-\tan A} + \frac{\cos(90-A)}{1-\cot A} = \cos A + \sin A$$

$$2. \operatorname{cosec} A + \frac{1}{\operatorname{cosec} A - 1} = (\sec A + \tan A)^2$$

$$3. \frac{\sin A}{\sec A + \tan A - 1} + \frac{\cos A}{\operatorname{cosec} A + \cot A - 1} = 1$$

$$4. \frac{\cot A - \cos A}{\cot A + \cos A} = \frac{\operatorname{cosec} A - 1}{\operatorname{cosec} A + 1}$$

$$5. \frac{\sin \theta - \cos \theta + 1}{\sin \theta + \cos \theta - 1} = \frac{1}{\sec \theta - \tan \theta} \quad (\sec^2 \theta = 1 + \tan^2 \theta)$$

$$6. \sqrt{\sec^2 \theta + \operatorname{cosec}^2 \theta} = \tan \theta + \cot \theta$$

$$7. \sqrt{\frac{1-\cos \theta}{1+\cos \theta}} + \sqrt{\frac{1+\cos \theta}{1-\cos \theta}} = 2 \operatorname{cosec} \theta$$

$$8. \frac{1}{\sec A + \tan A} - \frac{1}{\cos A} = \frac{1}{\cos A} - \frac{1}{\sec A - \tan A}$$

$$9. \frac{\operatorname{cosec} \theta - \sin \theta + 1}{\cos \theta + \sin \theta - 1} = \operatorname{cosec} \theta + \cot \theta$$

$$10. \frac{\sec \theta - \tan \theta}{\sec \theta + \tan \theta} = 1 + 2 \tan^2 \theta - 2 \sec \theta \cdot \tan \theta$$



## 10. Some Applications of Trigonometry

### I. Choose the correct Answers

1. If the length of the shadow of a tree is decreasing then the angle of elevation is \_\_\_\_\_  
a) Increasing b) Decreasing c) Remains the same d) None of the above
2. The angle formed by the line of sight with the horizontal when the point is below the horizontal level is called \_\_\_\_\_  
a) Angle of elevation b) Angle of depression c) No such angle is formed d) None of the above
3. The line drawn from the eye of an observer is said to be \_\_\_\_\_  
a) Angle of elevation b) Angle of depression c) Line of sight d) None of the above

### II. Answer the following (2 marks)

1. The angle of elevation of the top of a building from a point on the ground which is 15m away from the foot of the building is  $60^\circ$ . Find the height of the building
2. The height of the tower is 12m. What is the length of its shadow when the sun's altitude is  $45^\circ$ ?
3. A ladder leaning against a wall, makes an angle of  $60^\circ$  with the horizontal. If the foot of the ladder is 2.5m away from the wall, find the length of the ladder.
4. The angles of elevation of the top of a tower from two points at a distance of 4m and 9m from the base of the tower and in the same straight line with it are complementary. Find the height of the tower.

### III. Solve the following (3 marks)

1. The angle of elevation of the top of a building from the foot of the tower is  $30^\circ$  and the angle of elevation of the top of the tower from the foot of the building is  $60^\circ$ . If the tower is 50m high, find the height of the building.
2. The angle of elevation of the top of a tower at a distance of 120m from a point A on the ground is  $45^\circ$ . If the angle of elevation of the top of a flag staff fixed at the top of the tower at A is  $60^\circ$ , then find the height of the flagstaff.
3. As observed from the top of a 50m high lighthouse from the sea level the angles of depression of two ships are  $30^\circ$  and  $60^\circ$ . If one ship is exactly behind the other on the same side of the lighthouse, find the distance between the two ships.

**IV. Solve the following (4 marks)**

1. The angle of elevation of an aeroplane from a point A on the ground is  $60^\circ$ . After a flight of 15 seconds its angle of elevation changes to  $30^\circ$ . If the aeroplane is flying at a constant height of  $1500\sqrt{3}$ m, find the speed of the plane in km/hr.
2. The angle of elevation of the top of a hill from the foot of a tower is  $60^\circ$  and the angle of depression from the top of the tower of the hill is  $30^\circ$ . If the tower is 50m, high find the height of the hill.

## 11. Statistics

### Multiple Choice Questions

- The mode and mean is given by 7 and 8 respectively then the median is  
a)  $\frac{1}{13}$     b)  $\frac{13}{3}$     c)  $\frac{23}{3}$     d) 33
- The correct relationship between mean, median and mode is \_\_\_\_\_  
a)  $3\text{median} = \text{Mode} + 2\text{Mean}$   
b)  $2\text{Median} = 2\text{Mode} + \text{Mean}$   
c)  $\text{Median} = 2\text{Mode} + 2\text{Mean}$   
d)  $3\text{Median} = 2\text{Mode} + \text{Mean}$
- Cumulative frequency curve is also called \_\_\_\_\_  
a) Histogram    b) Ogive    c) Bar Graph    d) Median
- Construction of a cumulative frequency table is useful in determining the \_\_\_\_\_  
a) Mean    b) Median    c) Mode    d) All the above

### Three Marks Questions

- Find the mean of the given data

C.I	0-10	10-20	20-30	30-40	40-50
f	3	5	9	5	3

- Calculate the median for the following data

C.I	0-20	20-40	40-60	60-80	80-100	100-120	120-140
f	6	8	10	12	6	5	3

- Calculate the mode for the following frequency distribution table

C.I	5-15	15-25	25-35	35-45	45-55	55-65
f	6	11	21	23	14	5

4. Calculate the 'mean' for the frequency distribution table given below, by direct method.

Class Interval	Frequency
5 - 15	4
15 - 25	3
25 - 35	6
35 - 45	5
45 - 55	2

5. Find the 'mode' of the frequency distribution table given below.

Class Interval	Frequency
0 - 10	7
10 - 20	9
20 - 30	15
30 - 40	11
40 - 50	8

6. Find the median of the following data.

Class Interval	Frequency
1-5	4
5-9	3
9-13	5
13-17	7
17-21	1

7. Draw a less than Ogive for the given distribution table

Height (in Kg)	No. of Students
Less than 38	0
Less than 40	3
Less than 42	5
Less than 44	9
Less than 46	14
Less than 48	28
Less than 50	32
Less than 52	35

8. Draw a more than type Ogive for the following data

<b>Production</b>	50-55	55-60	60-65	65-70	70-75	75-80
<b>Number of farms</b>	2	8	12	24	38	16

9. The following table gives the production yield per hectare of wheat of 100 farms of a village. Draw a 'more than type ogive' for the given data.

<b>Production yield in kg/hectare</b>	<b>Cumulative Frequency</b>
More than or equal to 50	100
More than or equal to 55	98
More than or equal to 60	90
More than or equal to 65	78
More than or equal to 70	54
More than or equal to 75	1

10. Draw a "less than type ogive" for the data given in the following table

<b>Class Interval</b>	<b>Frequency</b>
0 - 10	2
10 - 20	12
20 - 30	2
30 - 40	4
40 - 50	3

## 12.Surface Areas and Volumes

### One Mark Questions

1. Write the formula to find the Lateral Surface Area of a Cuboid
2. Write the formula to find the Total Surface Area of a Cuboid
3. Write the formula to find the Volume of a Cuboid
4. Write the formula to find the Lateral Surface Area of a Cube
5. Write the formula to find the Total Surface Area of a Cube
6. Write the formula to find the Volume of a Cube
7. Write the formula to find the Curved Surface Area of a Cylinder
8. Write the formula to find the Total Surface Area of a Cylinder
9. Write the formula to find the Volume of a Cylinder
10. Write the formula to find the Curved Surface Area of a Cone
11. Write the formula to find the Total Surface Area of a Cone
12. Write the formula to find the Volume of a Cone
13. Write the formula to find the Curved Surface Area of a Hemisphere
14. Write the formula to find the Total Surface Area of a Hemisphere
15. Write the formula to find the Volume of a Hemisphere
16. Write the formula to find the Surface Area of a sphere
17. Write the formula to find the Volume of a sphere
18. Write the formula to find the Curved Surface Area of a Frustum
19. Write the formula to find the Total Surface Area of a Frustum
20. Write the formula to find the Volume of a Frustum
21. If the radius of a cylinder is 3 cm and height 5 cm then find its volume.
22. If the curved surface area of a cone is  $440\text{cm}^2$  and slant height is 7cm then find the radius of its base.
23. If the radius of a hemisphere is 3.5cm then find its lateral surface area
24. If the height of a cylinder whose lateral surface area is  $132\text{ cm}^2$  is 7cm then find its radius
25. If the surface area of a sphere is  $616\text{cm}^2$ . Find its radius.

### Two Marks Questions

1. A solid is made by joining the faces of two cubes of sides 5cm each. Find the surface area of this solid.
2. A copper rod of diameter 1cm and length 8cm is drawn into a wire of length 18 m of uniform thickness. Find the thickness of the wire.
3. A drinking glass is in the shape of a frustum of a cone of height 14cm. The diameters of its two circular ends are 4 cm and 2 cm. Find the capacity of glass.
4. A sphere of radius 9 cm is melted and reshaped into a cylinder of radius 6cm. Find the height of the cylinder.
5. A dustbin which is the shape of a frustum had its radius of both circular ends as 15cm and 8 cm. If its depth is 63cm then find its volume.
6. A cone of height 24cm and radius of base 6cm is made up of modeling clay. A child reshapes it in the form of a sphere. Find the radius of the sphere.

### Three Marks Questions

1. A toy is in the form of a cone of radius 3.5cm mounted on a hemisphere of same radius. The total height of the toy is 15.5cm. Find the total surface area of the toy.
2. A medicine capsule is in the shape of a cylinder with two hemispheres stuck to each of its ends. The length of the entire capsule is 14mm, and the diameter of the capsule is 5 mm. Find its surface area.
3. A hemispherical tank full of water is emptied by a pipe at the rate of  $3\frac{4}{7}$  litres per second. How much time will it take to empty half the tank, if it is 3m in diameter? (Take  $\pi = \frac{22}{7}$ )
4. Mayank made a birdbath for his garden in the shape of a cylinder with a hemispherical depression at one end. The height of the cylinder is 1.45m and its radius is 30cm. Find the total surface area of the bird-bath. (Take  $\pi = \frac{22}{7}$ )
5. A vessel is in the form of a hollow hemisphere mounted by a hollow cylinder. The diameter of the hemisphere is 14cm and the total height of the vessel is 13cm. Find the inner surface area of the vessel.
6. A *gulab jamun*, contains sugar syrup up to about 30% of its volume. Find approximately how much syrup would be found in 45 *gulab jamuns*, each shaped like a cylinder with two hemispherical ends with length 5cm and diameter 2.8cm.

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

#### **Four Marks Questions**

1. Rasheed got a playing top (*lattu*) as his birthday present, which surprisingly had no colour on it. He wanted to colour it with his crayons. The top is shaped like a cone surmounted by a hemisphere. The entire top is 5cm in height and the diameter of the top is 3.5cm. Find the area he has to colour. (Take  $\pi = \frac{22}{7}$ )
2. The radii of the ends of a frustum of a cone 45 cm high are 28cm and 7cm. Find its volume, the curved surface area and the total surface area (Take  $\pi = \frac{22}{7}$ )
3. Water in a canal, 6m wide and 1.5m deep, is flowing with a speed of 10km/h. How much area will it irrigate in 30 minutes, if 8cm of standing water is needed?
4. A wooden toy rocket is in the shape of a cone mounted on a cylinder. The height of the entire rocket is 26 cm, while the height of the conical part is 6cm. The base of the conical portion has a diameter of 5 cm, while the base diameter of the cylindrical portion is 3 cm. If the conical portion is to be painted orange and the cylindrical portion yellow, find the area of the rocket painted with each of these colours.