VIJAYAVEEDHI

Special Training Program for SSLC Students

(Mathematics)

District Institute of Education and Training (DIET)

KOTTAYAM

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FOCUS AREA

Unit	Unit Name	Focus Area
1	Arithmetic Sequence	• Concept arithmetic sequence • Position and term • Algebra of arithmetic sequences • Sum of first n Natural numbers • Sum of terms (Except algebraic form)
2	Circles	• Angles in a semicircle • Central angle of an arc and angle in the alternate arc • cyclic quadrlateral • Two chords AB and CD intersect at P then PA x PB = PC x PD • PA x PB = PC^2 • Square with equal area of rectangle
3	Mathematics of Chance	• Define chance mathematically
4	Second Degree Equations	• Formation of second degree equation • Squaring problems related area and perimeter of rectangles • Solution of second degree equqtion (square completion method)
5	Trigonometry	• Triangles with angles 30^0, 60^0, 90^0 and 45^0, 45^0, 90^0 • New measure of angles (sine, cosine) • Distance and heights (problems related to angles 30^0, 60^0 , 90^0 and 45^0, 45^0, 90^0 only)
6	Coordinates	• Coordinates and axes of coordinates • Defining position of points using pair of numbers • Coordinates of vertices of rectangle whose sides are parallel to the axis. • Distance between points
7	Tangents	• Concept tangents • Tangent through a point on a circle • Chord and tangent • Tangents from a point outside the circle

8	Solids	• Cone
9	Geometry and Algebra	• Coordinates of midpoints • slope of a line
10	Polynomials	• If $p(x) = q(x) \times r(x)$ then $q(x)$ and $r(x)$ are the factors of $p(x)$ • $(x-a)$ is a factor of $p(x)-p(a)$
11	Statistics	• Mean and median of ungrouped data

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1

ARITHMETIC SEQUENCE

FOCUS AREA

1) **Concept of Arithmetic sequence**
2) **Position And term**
3) **Algebraic form of arithmetic sequence**
4) **Sum of first n natural numbers**
5) **Sum of Arithmetic Sequence (Except algebraic form)**

Common difference (d) = x_2-x_1

1) Check whether each of the sequences given below is an arithmetic sequence.
   a) 16, 20, 24.....
   b) 1, 5, 10.....
   c) 2, 3, 5, 7....
   d) 1, 4, 9.....
   e) 5, 8,11.....
   f) 50, 44, 38.....

2) Find out the missing terms
   a) 3, 6, 9, ..., 15,...
   b) 10, 15, ...,....,30
   c) 5,...,11, 14,...
   d) 8,...,16,...,14

3) a) Write an arithmetic sequence with common difference 4
   b) Write another sequence by multiplying 3 and adding 2 to each terms of the above sequence.

4) Consider the sequence - 150,-145,-140.....
   a) Find the common difference?
   b) Write the next term.

5) 8^{th} term of an arithmetic sequence is 53, and the 15^{th} term is 102

a) Find the common difference?

b) Find the first term?

c) Write the sequence?

Work sheet -1

Term	Term	Common Difference	First Term	Write the sequence
$X_3 = 10$	$X_7 = 22$			
$X_5 = 23$	$X_{10} = 43$			
$X_8 = 42$	$X_{12} = ?$	5		

Algebraic expression of arithmetic sequence is Xn = dn+ (f-d)

If Xn=dn + b then common difference = d and First term = d+b

6) First term of an arithmetic sequence is 5 and the common difference is 3. Write the algebraic expression of the sequence.

7) The algebraic expression of an arithmetic sequence is Xn=4n+3

a) Write the first term

b) Find the common difference

Work sheet – 2

First Term	Common Difference	Algebraic Expression
-3	5	
-5	-2	
?	?	5n+2
?	?	4n-3

8) The algebraic expression of an arithmetic sequence is Xn=3n+2

a) Find the first term

b) What is the remainder when the terms are divided by 3?

c) Is 100 a term of this sequence?

9) If Xn=3n-2

a) Find the first term?

b) What is the remainder when the terms are divided by 3?

10) 2x+1, 4x-1, 5x+1 are the three consecutive terms of an arithmetic sequence

a) What is the value of x?

b) Write the terms

11) The sum of three consecutive terms of an arithmetic sequence is 15 and their product is 105

a) Find the first term?

b) Find the common difference?

c) Write the sequence.

- **In an arithmetic sequence, if the sums of positions of two pairs of terms are equal then, the sums of the pairs of the terms are also equal.**
- **If the number of terms is an odd number then Sum = number of terms × middle term**
- **Sum of first n natural numbers =** $\frac{n(n+1)}{2}$
- **Sum of first n odd numbers =** n^2
- **Sum of first n even numbers = n(n+1)**
- **In an arithmetic sequence the difference between the sum of first "n" terms and the next "n" terms =** dn^2
- **If** f_1 **and** f_2 **are first terms of two arithmetic sequences with same common difference , then the difference between the sum of their first n terms is** $(f_2 - f_1)$ **n,** $f_2 > f_1$
- **number of terms 'n' =** $\frac{x_n - x_1}{d} + 1$
- **Sum of first n terms =** $\frac{n}{2}(2f + (n-1)d)$ **OR** $S_n = \frac{n}{2}(x_1 + x_n)$

12) Find the sum of first 20 natural numbers.

13) Find the sum of 2+4+6+8.....+200

14) Consider the sequence 1,3,5,7....

a) Find the common difference?

b) Find the sum of first 50 terms?

15) The sum of first 5 terms of an arithmetic sequence is 60

a) Find the middle term

b) Write three arithmetic sequences whose sum of first five terms is 60.

16) Consider the sequence 6, 10, 14.....

a) Write the first term?

b) Find the common difference?

c) Write the difference between the sum of the first 10 terms and the next 10 terms?

17) 8^{th} term of an arithmetic sequence is 56. Find the sum of first 15 terms.

18) Sum of first 25 terms of an arithmetic sequence is 250

a) Find the middle term?

b) Find the 13^{th} term?

19) Consider the sequences 6, 10, 14.....and 15, 19, 23… Write the difference between the sums of first 20 terms of these sequences.

20) In an arithmetic sequence the 8^{th} term is 67 and the 18^{th} term is 147

a) Find the common difference?

b) Find the sum of first and 25^{th} terms?

c) Find the 13^{th} term?

d) Find the sum of the first 25 terms of this sequence?

21) The algebraic expression of an arithmetic sequence is $X_n=3n+2$. Find the sum of first 24 terms?

22) Consider the sequence of multiples of 7 between 200 and 500

a) Find the first term and the last term?

b) How many terms are there in this sequence?

c) Find the sum of the terms in this sequence

23) Study the pattern and answer the questions given below

1

3 5

7 9 11

13 15 17 19

.....

….....

a) Write the next 2 lines

b) Find the first term in the 15^{th} line? And what is the last term in this line?

c) Find the sum of the terms in the 15^{th} line

d) Find the sum of all terms of the first 15 lines?

More Questions

1) The n^{th} term of an arithmetic sequence is "m" and the m^{th} term is "n"

a) Find the common difference?

b) Find the $(m + n)^{th}$ term

2) Consider the sequence 4,7,10.....prove that the squares of all terms of this sequence are also the terms of this sequence.

3) From the following arithmetic sequences, find the position of the terms in which the terms are equal.

63, 65, 67, ...

3, 10, 17.....…

4) The angles of a right angled triangle are in arithmetic sequence .Find the angles.

5) The algebraic expression of an arithmetic sequence is $X_n = 3n-2$ Find the sum of first 24 terms?

6) The sum of an arithmetic sequence is $S_n = 3n^2+2n$

   a) Find the common difference?

   b) Find the first term?

   c) Write the algebraic expression of the arithmetic sequence

   d) Find the sum of first 10 terms.

2

CIRCLES

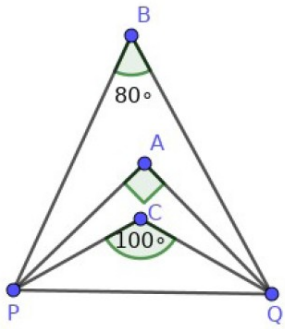
Concepts – I

* **Angle in a semi circle is 90^0**
* **Angle inside the semi circle is greater than 90^0**
* **Angle outside the semi circle is less than 90^0**

1) A circle is drawn with diameter AB. C is a point inside the circle. After drawing ΔABC , Remya measured <C as 70^0. But Reena measured it as 110^0. Which is the correct measurement of <C? Why?

2) In ΔABP A=30^0, B=70^0. If we draw a circle with AB as diameter where is the position of the point P? Why?

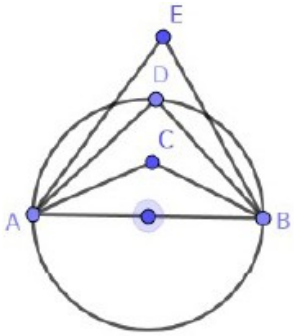
3) In the figure if we draw a circle with PQ as diameter find which of the points among A, B and C lies inside the circle, outside the circle or on the circle?



4) One of the angles of a triangle is 130^0. If we draw a circle with diameter as side opposite to this angle, where is the position of the vertex of this angle? Why?

5) InΔABC, <A=30^0, <B=60^0. If we draw a circle with AB as diameter find whether it will pass through C or not? Why?

6) AB is the diameter of the circle. D is a point on the circle. <ACB+ <ADB +< AEB = 270^0. Measure of one among <ACB, <ADB, <AEB is 110^0. Find the measures of <ACB, <ADB and <AEB.



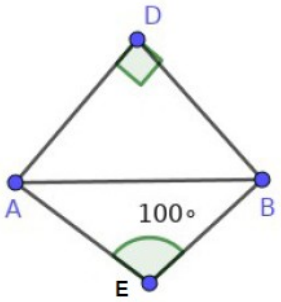
7) In ΔABC, AB=BC=AC

a) What are the measurements of each angle of ΔABC?

b) If we draw a circle with AB as diameter, where is the position of C?

8) In quadrilateral ABCD, <A= 80^0, < C=70^0, <D=120^0. If we draw a circle with AC as diameter where is the position of B?

9) If we draw a circle with AB as diameter check whether the vertices D and E are inside, outside or on the circle?



Concepts - II

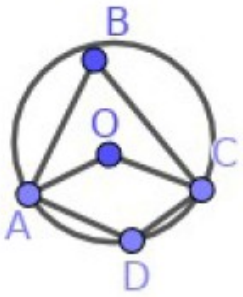
*** The angle made by an arc at the centre of the circle is double the angle at the alternate arc of a circle.**

*** All angles made by an arc on the alternate arc are equal; and a pair of angles on an arc and its alternate arc are supplementary.**

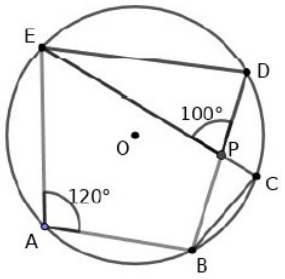
1) In the figure O is the centre of the circle, <AOC = 80^0

a) < ABC = ?

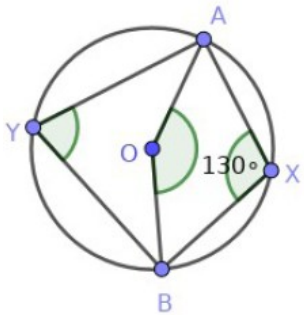
b) <ADC =?



2) In figure O is the centre of the circle. A, B, C, D and E are points on the circle. <EAB=120^0, <EPD = 100^0 .Find < EDB, <ECB and <DBC.



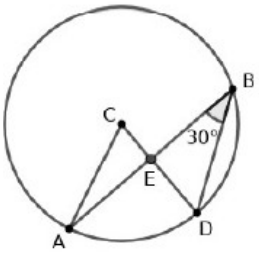
3) In figure O is the centre of the circle and <AXB= 130^0. Find <AYB and <AOB.



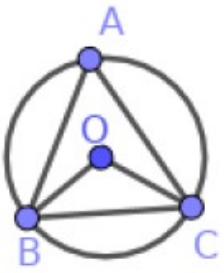
4) In the figure C is the centre of the circle and <ABD = 30^0

a) Find <ACD?

b) If <ABD =<CAB and AB=6cm. Find the radius of the circle?



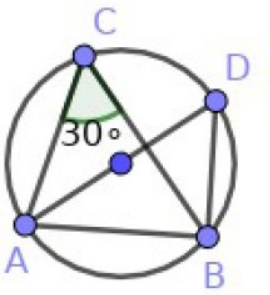
5) In the figure O is the centre of the circle. ΔABC is an isosceles triangle and ΔOBC is an equilateral triangle. Find <A and <ABO.



6) In the figure AD is the diameter of the circle. C and D are points on the circle. <C= 30^0.

a) <D =.....

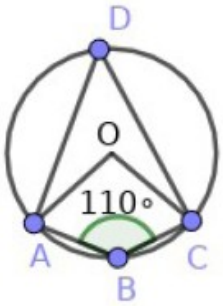
b) <ABD =.....



7) A, B, C and D are the points on the circle with centre O. If <B=110^0.

a) Fnd <D?

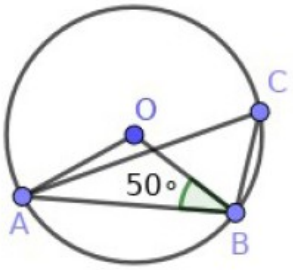
b) What is the measure of <AOC?



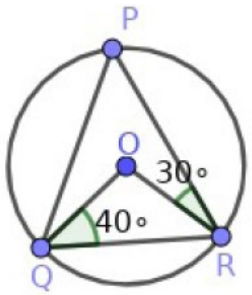
8) In the figure O is the centre of the circle and A, B, C are the points on the circle. If <OBA=50^0.

a) Find <ACB?

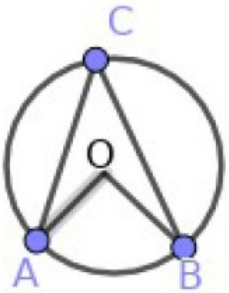
b) If we moves the point C along the circle in such a way that <ACB increases by 100^0 where is the new position of C?



9) In the figure O is the centre of the circle and P, Q, R are the points on the circle. $\angle OQR=40^0$, $\angle ORP=30^0$. Find all angles of Δ PQR.



10) In the figure O is the centre of the circle and A, B, C are the points on the circle. Prove that $\angle ABC + \angle OAC=90^0$



Constructions

1) Draw a circle of radius 4cm. Draw a triangle ABC in which the vertices A, B, C are all on this circle and $\angle A= 60^0$, $\angle B = 50^0$.
2) Circum radius of a triangle is 4cm and two of the angles are $30^0$and 110^0. Draw the triangle.

More Questions

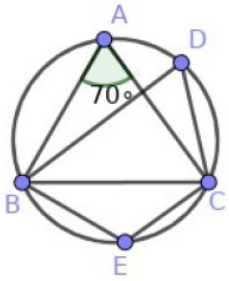
1) a) Draw a circle with centre O and radius 4cm
   b) Mark the points A, B on the circle such that $\angle AOB=60^0$
   c) Without using protractor draw angles which measures 30^0 and 150^0 in this picture.
2) a) Circum radius of a triangle is 4.5 cm and two of the angles are $37\frac{1}{2}^0$ and $112\frac{1}{2}^0$. Draw the triangle.
   b) Measure the longest side of this triangle

Concept – III

*** The sum of opposite angles of a cyclic quadrilateral is 180^0**

*** If the sum of opposite angles of a quadrilateral is 180^0 then it is known as cyclic quadrilateral**

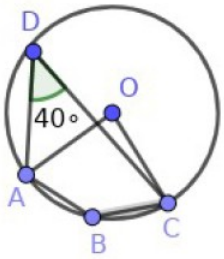
1) In ΔABC, <BAC=70^0



   a) Find <BDC.
   b) How many cyclic quadrilaterals are there in this figure? Which are they?
   c) Find <BEC.

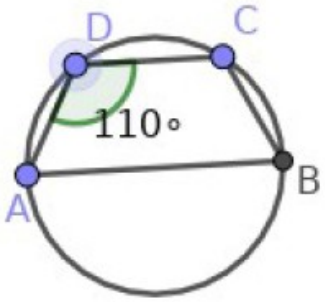
2) A, B, C, D are the points on the circle with centre O. If <D=40^0

   a) Find <AOC
   b) Find < ABC



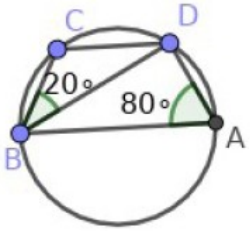
3) ABCD is a cyclic quadrilateral. AB is the diameter of the circle. AD=CD and If <ADC=110^0

   a) Find <ACB
   b) Find <ABC
   c) Find< DCB
   d) Find <BAD



4) C and D are the points on the circle with diameter AB. If <BAD=80^0 and < DBC=20^0

   a) Find <BCD
   b) Find <CDB
   c) Find <ADC
   d) Find <ABD

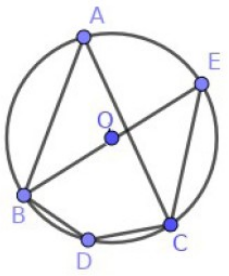


5) In the figure O is the centre of the circle and BD=CD If <DBC=35^0

a) Find <BDC

b) Find <BAC

c) Find <EBC



Concept - IV

*** If the chords AB and CD intersects inside the circle at P then PA x PB = PC x PD**

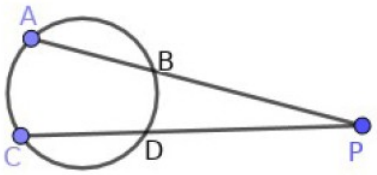
*** If the chords intersects outside the circle then also PA x PB=PC x PD**

*** From these intersected chords one chord is the diameter and the other is perpendicular to the diameter then PA x PB=PC^2**

1) In the figure the chords AB and CD are intersect at the point P. If PD=3cm and CD=2cm

a) Find the length of PC

b) Find the value of PA x PB?

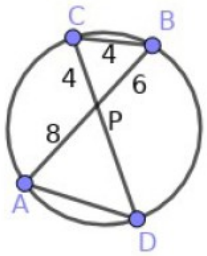


2) In the figure the chords AB and CD are intersect at the point P. PA=8cm, PB= 6cm, PC= 4cm, BC= 4 cm then

a) Find the length of PD?

b) Find the length of AD?

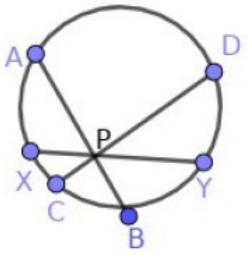
c) Which is the angle equal to <A?



3) In the figure the chords AB, CD and XY intersect at P. AP=9 cm, AB=13 cm, PD=12cm

a) What is the length of CD?

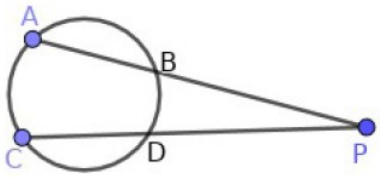
b) If PX=PY find XY?



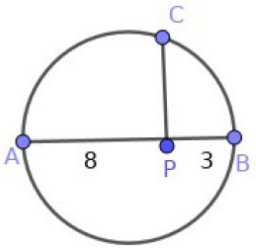
4) In the figure the chords AB and CD extended outside to meet at the point P.

a) Prove that PA x PB=PC x PD

b) If PA=PC then prove that AB=CD



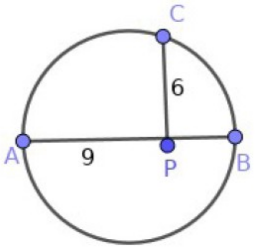
5) In the figure AB is the diameter and PC is perpendicular to AB. PA=8cm, PB= 3cm Find PC?



6) In figure AB is the diameter and PC is perpendicular to AB. PA=9cm, PC= 6cm then

a) What is the length of PB?

b) Find the radius of the circle



7) Draw a rectangle of sides 4cm and 3cm.Draw a square having same area.

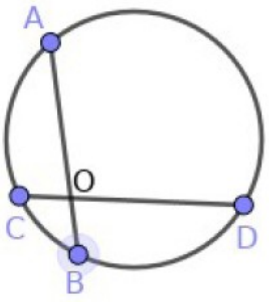
8) Draw a square of area 15 cm^2.

9) In the figure length of the chord AB is 8cm. OA=5cm

a) Find the length of OB?

b) Find the relation between OA, OB, OC and OD

c) If OC=2.5 cm then find the length of OD?

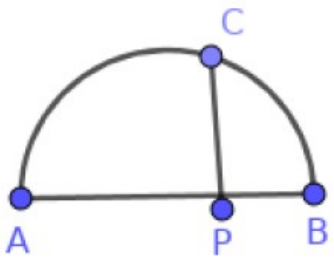


10) In the figure AB is the diameter and PC is perpendicular to AB. PA: PB=2:1 and PC=6cm

a) What is the relation between PA, PB and PC?

b) Find the length of PA and PB.

c) What is the radius of the circle?



3

MATHEMATICS OF CHANCE

Focus point

Defining chance mathematically

1) There are 5 blue beads and 7 black beads In a box. If one bead is taken without looking,
   a) What is the probability of getting a blue bead?
   b) What is the probability of a black bead?

2) Each letter of the word 'MALAYALAM' is written on paper slips and put in a box. If one slip is taken, what is the probability of,
   a) getting the letter M
   b) getting the letter A

3) A person is asked to say a number between 1 and 10. What is the probability of,
   a) The number is a multiple of 3
   b) The number is a perfect square

4) Ramu is asked to say a 2-digit number.
   a) How many numbers could Ramu say?
   b) What is the probability of the number to be a perfect square?
   c) What is the probability of getting the digits of the number equal?

5) The numbers from 1 to 20 are written on different paper slips and put in a box.If a slip is chosen without looking,
   a) What is the probability of the number is a multiple of 5
   b) It is an even number
   c) It is a prime number

6) a) How many two digit numbers could be written using the digits 1,2 and 3?
   b) If a person is asked to say a number among these numbers,what is the probability of it is a number with same digits?

7) A person is asked to say a number from 1 to 10.
   a) What is the probability of saying a prime number?
   b) What s the probability of saying an even number?

8) There are 12 balls in a box.Out of them 5 are blue and the rest are red.If a ball is taken without looking,what is the probability of,
   a) getting a blue ball
   b) getting a red ball
   c) If one more ball of each colour is again put in the box,will the probability of getting blue ball increase or decrease?

9) There are 20 balls in a box. Some of them are white and the others are black. The probability of getting a black ball,when taken,is $\frac{1}{4}$.
   a) What is the number of black balls?
   b) What is the number of white balls?
   c) What is the probability of getting a white ball?

10) What is the probability of getting 5, when a dice is thrown?

11) What is the probability of 53 Sundays in a leap year?

12) There are five black beads and 7 white beads In a box.Also there are 6 black beads and 8 white beads in another box. Which box is better for getting a black bead?

13) Numbers 1 to 25 are written on cards and put in a box.If one card is taken, what is the probability of,
   a) getting a multiple of 4
   b) getting a perfect square

14) A man says that the probability of an egg is rotten, out of his 400 eggs is 0.035. Then what will be the total number of rotten eggs?

15) How many 3 digit numbers can be written using 1,2 and 3? What is the probability of the numbers with same digits?

16) There are 4 paper slips written 1,2,3 and 4 in a box. Also 3 paper slips written 1,2 and 3 in another box. If one paper slip from each box is taken at a time, what is the probability of the sum of those two numbers is a multiple of 3? What about it is a multiple of 2?

17) There are 2 boxes. Each box contains 10 paper slips written numbers from 1 to 10.If one paper slip each from each box is taken, what is the probability of both are prime numbers?

18) 10 even numbers and 15 odd numbers are written each on each paper slips and put in a box. like this 20 even numbers and 30 odd numbers are written and put in another box. If one paper slip each from each box is taken, what is the probability of,
   a) both are odd numbers
   b) atleast one is odd

19) If 2 dice are thrown simultaneously, what is the probability of the sum of both fallen numbers is 5? What is the probability of sum to be a multiple of 3?

20) What is the probability of 5 Sundays in December.

21) In a class, out of 50 students,30 are boys.In other class out of 40 students 25 are boys. If one student each from each class are chosen,
   a) What is the total number of pairs?
   b) What is the total number of pairs which are both boys
   c) What is the total number of pairs which are both girls
   d) What is the total number of pairs in which one is a boy and the other is a girl?

22) There are 60 students in a class. Out of it 30 are boys. There are 50 students in another class and out of it 25 are boys. If one student each from each class is chosen, what is the probability of,

a) both are girls?

b) Atleast one girl?

23) If a coin is thrown, what is the probability of,

a) getting head?

b) getting tail?

24) Numbers 1,2,3,4,5,6 are marked each on each phase on a cube and it is put down.

a) What could be the possible outcomes?

b) What is the probability of getting an even number?

c) What is the probability of it is to be a multiple of 3?

d) What is the probability of it is to be a prime number?

e) What is the probability of it is to be an odd number?

f) What is the probability of it is neither a prime number nor a composite number?

25) There are 3 black balls and 4 white balls in a box. If one ball is taken from it what is the probability of,

a) It is a black ball?

b) It is a white ball?

26) There are 2 boxes. The first box contains 6 black beads and 8 white beads. In the second box 8 are black and 6 are white.

a) If one bead is taken, which box has more probability of getting a black bead?

b) If all the beads are put in one box and one bead is taken, which bead has more probability?

27) Numbers 1 to 20 are written on paper slips and put in a box.If one slip is chosen,what is the probability of,

a) it is an odd number?

b) It is an even number?

c) It is a perfect square?

d) It is a multiple of 3?

e) It is a multiple of 10?

28) There are 8 black beads and 5 white beads in a box. Also there are 6 black beads and 10 white beads in another box. If each bead is taken from each box,

a) what is the total number of pairs?

b) what is the probability of both are white?

c) what is the probability of both are black?

d) what is the probability of one black and one white?

e) what is the probability of atleast one white?

29) a) How many 3 digit numbers could be written using the digits 2,4,7,without repeating?

b) what is the probability of the written 3 digit numbers is an odd number?

c) what is the probability of it is to be an even number?

30) Counting numbers 1 to 4 are written on each paper slips and put in a box. Also counting numbers from 2 to 4 are written on each paper slips and put in another box. If one paper slip each from each box is taken without looking,

a) what is the total number of pairs?

b) what is the probability of both numbers are same?

c) what is the probability of the sum of the numbers is 8?

d) What is the probability of the sum is 5?

e) what is the probability of one number is double that of the other?

31) There are 20 boys and 25 girls in 10 A class. And in 10 B,25 boys and 15 girls. One student each from each class are chosen.

a) what is the total number of pairs?

b) what is the probability of both are boys?

c) what is the probability of both are girls?

d) what is the probability of one boy and one girl?

e) what is the probability of atleast 1 girl?

32) Some green balls and some blue balls are there in a box.10 red balls are added to it. If one ball is taken, the probability of it is to be a red ball is $\frac{10}{33}$ and that of a blue ball is $\frac{1}{3}$.

a) what is the total number of balls in the box?

b) what is the number of blue balls?

c) If one ball is taken from the box, what is the probability of it is to be a green ball?

d) If one ball is taken, what is the probability of it is to be a blue ball or a red ball?

4

SECOND DEGREE EQUATIONS

WORKSHEET – 1

Make Algebriac Equations

1. The square of a number is 16.
2. If 7 is added with the square of a number gives 16.
3. If a number is added with the square of that number gives 12.
4. If four times a number is added with the square of that number gives 16.
5. The sum of a number and its square is 30.
6. The sum of a number and its square is 7 times the number.
7. The sum of a number and its reciprocal is $\frac{5}{2}$.

WORKSHEET – 2

1) Sum of 2 numbers is 11 and their product is 30.
   a) If one number is x, then the other number =……..
   b) Frame the equation.
2) Perimeter of a rectangle=2(…..+…..).
   Half of the perimeter of the rectangle =……..
3) The perimeter of a rectangle is 24 cm and its area is 20 sq.cm.
   a) Half of the perimeter =……..
   b) If **x** is the breadth, length =……..
   c) What is the equation for finding the area of the rectangle?
4) If the perimeter of a rectangle is 34cm and its area is 60 sq.cm, the equation to denote the area of the rectangle is ……..
5) The length of a rectangle is 4cm more than its breadth.Its area is 140sq.cm.
   a) If x is the breadth, length =……..
   b) Frame the equation of the area.
6) The length of a rectangle is 6cm more than its breadth.If its area is 160 sq.cm, write the equation representing the area.

WORKSHEET – 3

1) If the sides of a square are increased by 1cm, the area becomes 49 sq.cm.
   a) If the side is taken as **x**, the side of the new square =……
   b) Write the equation representing the area.

2) The product of 2 consecutive natural numbers is 156.
   a) If one number is taken as **x**, the other number =……
   b) Frame the equation.

3) The product of 2 consecutive even numbers is 168.
   a) If one number is taken as **x**, the other number =……

4) The product of 2 consecutive numbers of an arithmetic sequence with common difference 6 is 280.
   a) If one number is taken as **x**, the other number =……
   b) Frame the equation.

5) The sum of the squares of 3 consecutive natural numbers is 110.
   a) If one number is taken as **x**, the other numbers are ……
   b) Frame the equation.

Completing the Square

For every numbers **x** and **a**,
$\mathbf{x^2+2ax+a^2=(x+a)^2}$
$\mathbf{(\frac{a}{2})^2}$ should be added to $\mathbf{x^2+ax}$, to get a perect square.
$\mathbf{x^2+ax+(\frac{a}{2})^2 = (x+\frac{a}{2})^2}$

Worksheet-4

Sl. No.	Algebraic Expression	No. to be added to get a Perfect Square	Write as perfect square
1	$x^2 + 4x$	$(\frac{4}{2})^2 = 2^2 = 4$	$x^2 + 4x + 4 = (x+2)^2$
2	$x^2 + 6x$		
3	$x^2 + 2x$		
4	$x^2 + 8x$		
5	$x^2 + 5x$		
6	$x^2 + 7x$		
7	$x^2 + 10x$		
8	$x^2 + 15x$		
9	$x^2 + x$		
10	$x^2 + 12x$		

Worksheet-5

Fill up the blanks in the following:

1) $x^2 + 4x = 21$

$x^2 + 4x +$ ------- $= 21 +$ ----------
$(x +$---$)^2 =$ ----------
$x =$ ----------

2) $x^2 + 10x = 75$

$x^2 + 10x +$ ------- $= 75 +$ ----------
$(x +$---$)^2 =$ ----------
$x =$ ----------

3) $x^2 + 6x = 27$

$x^2 + 6x +$ ------- $= 27 +$ ----------
$(x +$---$)^2 =$ ----------
$x =$ ----------

4) $x^2 - 8x = 65$

$x^2 - 8x + \_\_\_\_\_ = 65 + \_\_\_\_\_$

$(x - \_\_\_)^2 = \_\_\_\_\_$

$x = \_\_\_\_\_$

5) $x^2 - 12x = 108$

$x^2 - 12x + \_\_\_\_\_ = 108 + \_\_\_\_\_$

$(x - \_\_\_)^2 = \_\_\_\_\_$

$x = \_\_\_\_\_$

Worksheet-6

Find the solution of the following using square completion method

1) If **'x'** is a counting number

a) Write the square of the number

b) What is 4 times the number?

c) If 4 times the number is added with the square of the number gives 140,what is the number

2) If **'x'** is the present age of Vinu,

a) What is his age after 6 years?

b) Write the product of his present age and his age after 6 years in the algebraic form

c) If this product is 91, what is his present age?

3) If **'x'** is a natural number,

a) What is the next natural number?

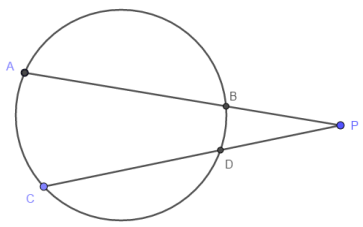
b) Write the sum of the squares of these two numbers in the algebraic form

c) If the sum of the squares of these two numbers is 85,find the numbers

4) In the figure AB = 10 cm , PD = 8 cm , CD = 4 cm , PD = x

a) PA = …...

b) PC = …...



5) Consider the arithmetic sequence 4,7,10……..

a) What is the first term and common difference?

b) Write the algebraic form of the sequence

c) Which term's square is 4900?

6) One side of a square is '**x**' cm. Consider another square of side 4cm less than the first square. What is,

a) One side of the new square?

b) area of the new square?

c) If the area of the second square is 64cm², What is the length of a side of the first square

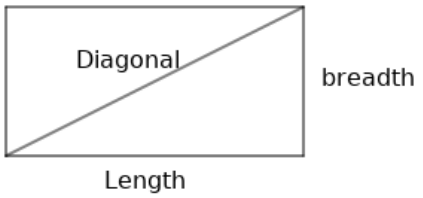
7) There is a uniform path of width 2m around a square field. If the side of the field is '**x**'m,

a) What is the length of a side of the field with the path

b) What is the area of the field including the path

c) If the area of the field and the path together is 2500cm²,what is the length of a side of the field only

Focus Area :



Perimeter of Rectangle = 2 (Length + Breadth)

Area of Rectangle = Length **X** Breadth

$Diagonal^2 = Length^2 + Breadth^2$

Worksheet-7

1) We have to construct a rectangle of perimeter 100m and area 600sq.m

a) If the breadth is taken as **x,**what will be the length?

b) Write the area of this rectangle as an algebraic equation

c) Find the length and breadth of the rectangle using this algebraic equation

2) The length of a rectangular plot is 4m more than its breadth. Its area is 320sq.m

a) If the breadth is taken as x, what will be the length?

b) Write the area of this rectangle as an algebraic equation

c) Find the length and breadth of the plot

3) An iron rod 28cm long is to be bent to make a rectangle. The area of that rectangle should be 192sq.cm.

   a) What is the sum of its length and breadth?

   b) Write the area of the rectangle in the algebraic form by taking the breadth as '**x**'

   c) Find the length and breadth of the rectangle

4) A piece of breadth 2cm is cut off from a square sheet of paper. The area of the remaining portion is 120sq.cm

   a) If '**x**' is the side of the square,how can we represent the length and breadth of the remaining rectangle

   b) Frame the algebraic equation to find the area of the rectangle

   c) What is the length of a side of the square?

5) The length of a rectangle is 7cm more than its breadth.

   a) If the breadth is taken as '**x**', What will be the length

   b) If the diagonal of the rectangle is 13cm, find its length and breadth?

5

TRIGONOMETRY

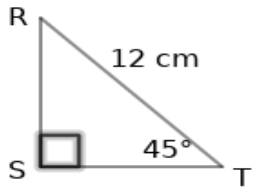
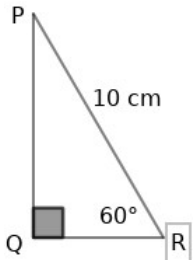
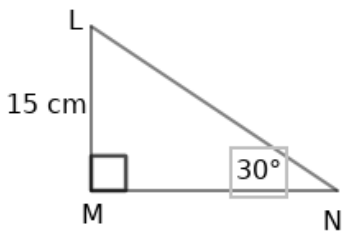
Focus Area

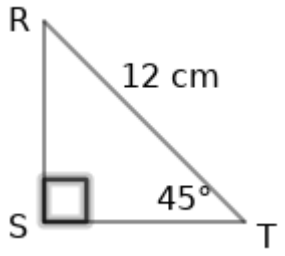
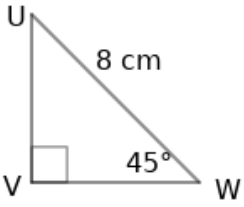
- **Triangles with angles 45°,45°,90° & 30°,60°,90°.**
- **New measure of angles(sin,cos).**
- **Distance and heights(questions related to 45°,45°,90° & 30°,60°,90° only)**

Ratio of sides of a 30°,60°,90° right triangle = 1:√3:2

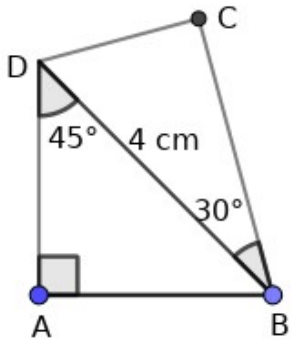
Ratio of sides of a 45°,45°,90° right triangle = 1:1:√2

Worksheet

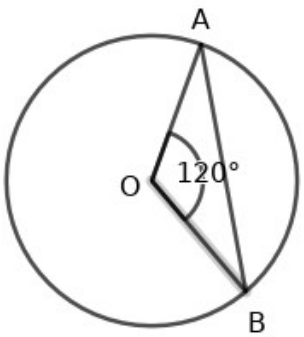
	BC=12cm	AB=.....	AC=.....
	PR=10cm	PQ=.....	QR=.....
	LM=15cm	LN=.....	MN=.....

	TR=12cm	RS=.....	TS=.....
	UV=8cm	VW=.....	UW=.....

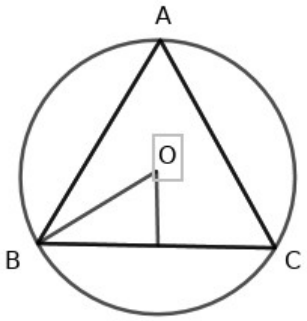
1) In the figure, find the length of all sides of quadrilateral ABCD



2) In the figure,O is the centre of the circle.OA=2cm,<AOB=120°.What is the length of chord AB?



3) In the figure, angles of △ABC are equal. OB = 3 cm. Find the sides of the triangle?



4) The length of the diagonal of a square is 20cm. what is:
   a) the length of one side of the square?
   b) the perimeter of the square?
   c) area of the square?

5) The shortest distance between the opposite vertices of a rectangular field is 30m. This length makes 30° with one side.
   a) Find the length and breadth of the field.
   b) What is the perimeter of the field.
   c) What is the area of the field.

If the opposite side of an acute angle of a right triangle is divided with the hypotenuse, the 'sin' of that angle is obtained.

$$\text{Sin A} = \frac{Opposite \quad of \quad A}{hypotenuse}$$

If the adjacent side of an acute angle of a right triangle is divided with the hypotenuse, the 'cos' of that angle is obtained.

$$\text{Cos A} = \frac{Adjacent \quad of \quad A}{hypotenuse}$$

If the opposite side of an acute angle of a right triangle is divided with the adjacent side, the 'tan' of that angle is obtained.

$$\text{Tan A} = \frac{Opposite \quad of \quad A}{Adjacent \quad of \quad A}$$

If two sides of a triangle are **a** and **b** and the angle between these two sides is **C,**

1) The height from opposite vertex to the side **a** is, **h=b SinC**
2) The height from opposite vertex to the side **b** is **h=a SinC**
3) Area of the triangle=$\frac{1}{2}$ **abSinC**

Sin 30°=Cos 60°=$\frac{1}{2}$ **Cos 30°=Sin 60°=**$\frac{\sqrt{3}}{2}$

Sin 45°=Cos 45°= $\frac{1}{\sqrt{2}}$

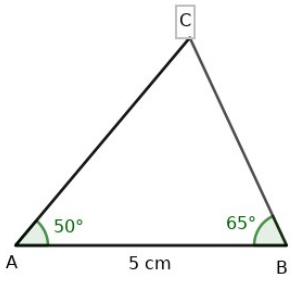
Tan 30°= $\frac{1}{\sqrt{3}}$ **Tan 45°=1** **Tan 60°=√3**

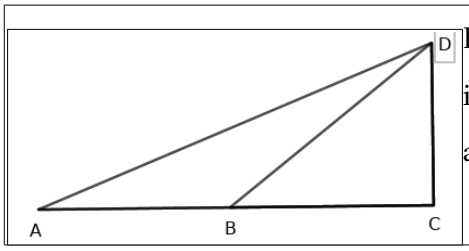
6) One side of an equilateral triangle is 6cm.
   a) What is the measure of one angle?
   b) What is the circum radius?

7) Two sides of a triangle are 8cm, 9cm and the angle between these two sides is 60°,what is the area of the triangle?

8) In △ABC, AB=AC=10cm. <B=50°.
   a) What is the measure of <A?
   b) What is the perpendicular distance from C to AB?
   c) What is the area of △ABC?
   (sin80 = 0.98 , cos80=0.17 , sin50 = 0.77, cos50 = 0.64)

9) In △ABC, AB=5cm, <A=50°, <B=65°
   a) What is <C?
   b) What is the speciality of △ABC?
   c) What is the perpendicular distance from C to the side AB?
   d) What is the area of △ABC?
   (sin50=0.77, cos50=0.64, tan50=1.19)





If <B is double that of <A, <ABD=180-B. Thus △ABD is an isosceles triangle. Therefore AB=BD. Thus CD and BC can be calculated using **Sin** and **Cos.**

10) A boy standing 50m away from the foot of a tower, on the ground, sees the top of the tower at an angle of elevation 30°.
   a) Draw a rough figure.
   b) What is the height of the tower?

11) A boy standing on the bank of a river sees the top of a tree on the other bank at an elevation of 60°.Stepping 40m back, he sees it at an elevation of 30°
   a) Draw a rough figure.
   b) What is the height of the tree
   c) What is the width of the river

12) A boy standing at the foot of a building,40m away from the foot of a tower sees the top of a tower at an angle of elevation 60°.On climbing to the top of the building, he sees the top of the tower at an angle of elevation 30°.
   a) Draw a rough figure.
   b) What is the height of the tower?
   c) What is the height of the building?

13) Two buildings in a plane ground are 30m apart.From the top of the smaller building,a boy sees the base of the larger building at an angle of depression 45° and its top at an angle of elevation 30°.
   a) Draw a rough figure
   b) find the heights of both buildings?

MORE QUESTIONS

1) A flag post is placed vertically in a river of width 100 m. Two boys are standing on either banks of the river, so that they are in a straight line with the flag post. One boy sees the top of the post at an angle of elevation $30^0$and the other one sees the same at an elevation 60^0.
   a) Draw a rough figure.
   b) Find the height of the flag post above the river.

2) A boy saw the top of a building under construction at an angle of elevation 30°.The completed building was 12m higher and the boy saw its top at an angle of elevation 60° from the same spot.
   a) Draw a rough figure
   b) what is the heiht of the building?
   c) What is te distance between boy the and the building?

6

COORDINATES

Focus area

Concepts related to coordinate axes, coordinate numbers

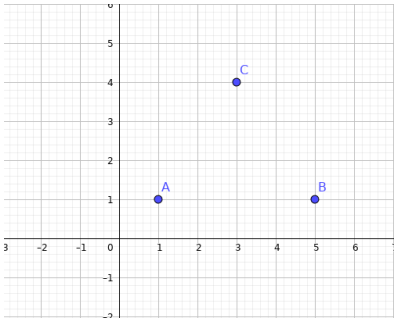
Defining position of points using coordinate numbers

1) Draw the co-ordinate axes and plot the points A(2,3), B(1,5), C(-2,3), D(-3,-3),E(3,-4) F(0,3) and G(-2,0).
   a) Find out the points which are on the X axis?
   b) Find out the points which are on the Y axis?

2) Draw X, Y axis and mark the given points. A(2,0) , B(0,4) , C(3,2) ,D(5,0) ,E(5,2) ,F(3,1) and G(0,3).
   a) Find out the points which are on the X axis?
   b) Find out the points which are on the Y axis?
   c) Find out the points which are parallel to the X axis?
   d) Find out the points which are parallel to the Y axis?
   e) The _____ coordinate of all points on a line parallel to the x-axis are equal.
   f) The _____ coordinate of all points on a line parallel to the y-axis are equal.

3) Draw X, Y axis and mark the points A (2, 3) and B (-2, 3).
   a) Find the distance from X axis to the point A?
   b) Find the distance from Y axis to the point B?
   c) What is the peculiarity of the line AB?

4) a) From the figure find the coordinates of the points A, B and C.
   b) What type of polygon we are getting by joining the points A, B and C?



5) The radius of a circle centered at the origin is 5 cm

   a) Find the co-ordinate of the points at which the circle cut the X- axis?

   b) Find the coordinate of the points at which the circle cut the Y- axis?

   c) Write two more points on the circle.

6) Draw X,Y axes and plot the points $A(2,2)$, $B(5,2)$, $C(5,5)$ and $D(2,5)$

   a) What type of polygon we are getting by joining the points A, B, C and D?

   b) Find the sides which are parallel to the X- axis

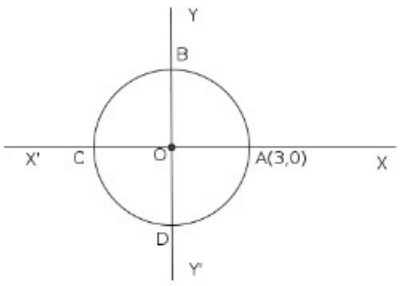
   c) Find the sides which are parallel to the Y- axis

7) a) AB is a line parallel to the X- axis and $(2, 3)$ is a point on this line .Find 2 more points on this line

   b) CD is a line parallel to the Y- axis and $(5, 1)$ is a point on the line .Find 2 more points on this line

   c) Find the point of intersection of the lines AB and CD

8) In the figure 'O' is the centre of the circle A $(3, 0)$ is a point on this circle. Find the coordinate of the points B, C and D.

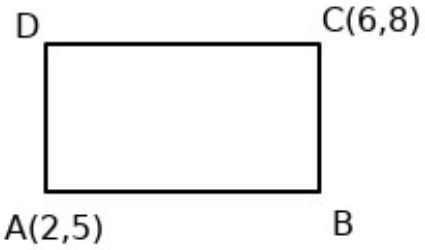


Worksheet-2

Focus area

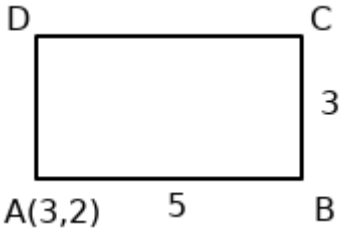
Coordinates of the vertices of a rectangle in which the sides are parallel to the coordinate axes.

1) The sides of the rectangle ABCD are parallel to the coordinate axes. Find the coordinate of the points B and D?



2) The sides of the rectangle ABCD are parallel to the coordinate axes. The coordinate of opposite vertices are $(3, 5)$ and $(7, 8)$ .Find the coordinate of the other two vertices.

3) In figure the sides of the rectangle ABCD are parallel to the coordinate axes. The length of the rectangle is 5 units and the breadth is 3 units.



a) What is special about the Y –coordinates of the points on the line which are parallel to the X axis.

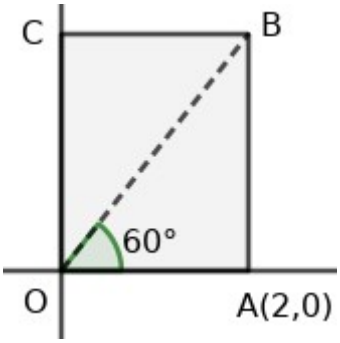
b) Find the coordinate of the points B, C, and D

4) In the figure, OABC is a rectangle. The coordinate of A is $(2, 0)$. Angle AOB = 60^0.

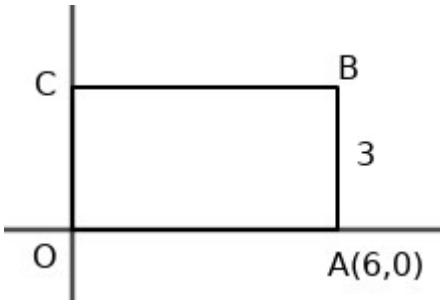
a) Find the length of OA

b) Find the length of AB

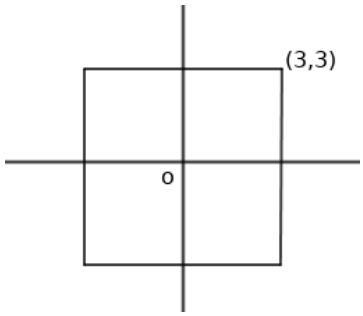
c) Find the coordinate of the point "B".



5) In the figure breadth of the rectangle OABC is 3. Find the coordinate of the points B & C.



6) The sides of the given square are parallel to the coordinate axes. The origin is the midpoint of the square .One coordinate of the vertex of the square is $(3, 3)$.Find the coordinate of any other two vertices.



Focus area

Distance between the points

Distance between the points (x_1,y) and $(x_2,y) = \|x_1-x_2\|$
Distance between the points (x,y_1) and $(x,y_2) = \|y_1-y_2\|$

Worksheet-3

Points	Distance
$(3 , 0) , (5 , 0)$ $(2 , 1) , (6 , 1)$ $(-5, 5) , (-3 , 5)$ $(0, 1) , (0, 4)$ $(1 , 4) , (1 , 7)$ $(3 , -5) , (3 , 8)$	

1) a) The line joining the points $(4, 3)$ and $(7, 3)$ is parallel to which axis?

b) Find the distance between these points?

2) The line joining the points $(3, 2)$ and $(3, 7)$ is parallel to which axis?

b) Find the distance between these points?

Distance between the points (x_1, y_1) and (x_2, y_2) = $\sqrt{(x_1 - X_2)^2 + (y_1 - y_2)^2}$

Distance between the origin and the point (x, y) = $\sqrt{x^2 + y^2}$

Worksheet-4

Points	Distance
(6 , 4) , (3 , 1)	
(6 , -4) , (-3 , 1)	
(-6 , -4) , (-3 , -1)	
(-6 , 4) , (3 , 1)	
(4 , 3) , (0 , 0)	
(-4 , -3) , (0 , 0)	

1) a) Draw the coordinate axes and mark the points $(3, 0)$, $(8, 0)$, $(11, 4)$ and $(6, 4)$ .Join the points to form a quadrilateral.

b) Find the length of the sides of the quadrilateral.

c) Write the most suitable name for this quadrilateral.

2) a) Find the coordinates of the points on X axis which are at distance 4 units from the point $(3, 4)$

b) Find the coordinates of the points on X axis which are at distance 5 units from the point $(3, 4)$

3) The coordinate of the opposite vertices of a rectangle are $(7, 8)$ and $(1, 3)$.

a) Without drawing coordinate axes mark the given pairs of points with left-right, top-bottom position correct.

b) Find the coordinates of the other vertices.

c) Find the length of diagonals of this rectangle.

4) A $(4, 4)$, B $(3, 5)$, C $(-1, -1)$ are the three vertices of a triangle.

a) Find the length of the sides AB, BC and AC.

b) Prove that these points are the vertices of a right angled triangle

5) A(2,3) , B(5,4) , C(6,7) are the three vertices of a triangle.

a) Find the length of the sides AB, BC and AC.

b) Prove that ABC is an isosceles triangle.

6) If origin is the centre of the circle and $(3, 4)$ is a point on the circle, find the radius of the circle?

7) A $(4, 5)$ and B (1,-4) are two points on the circle with center 'P' which lies on X-axis .Let "k" be the x coordinate of the point P,

a) Find the Y- coordinate of the point P.

b) Find the length of PA and PB.

c) Find the value of 'k'

d) Find the radius of the circle?

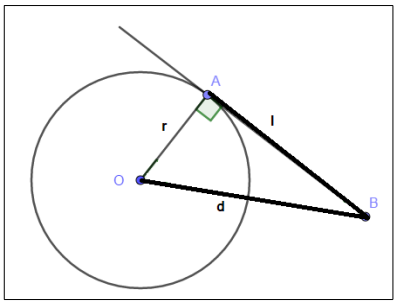
7

TANGENTS

Concepts

***Tangent**

***Tangent through a point on the circle.**



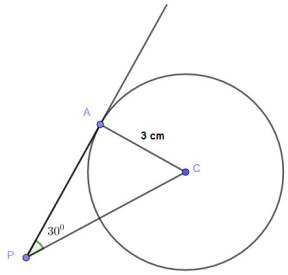
The radius and tangents are mutually perpendicular. $d^2=l^2+r^2$

1) In the figure 'C' is the centre of the circle and PA is a tangent. < P=30^0, radius of the circle is 3 cm.

   a) Find the remaining angles of ΔPAC

   b) What is the length of the tangent?

   c) Find the perimeter and area of the triangle

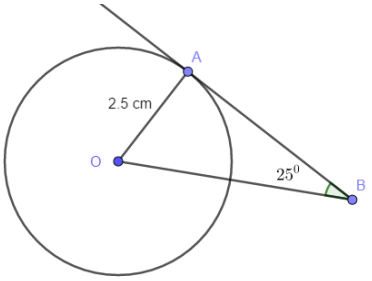


2) In the figure AB is the tangent of the circle with centre 'O'.

   a) < A=.....

   b) < AOB =.....

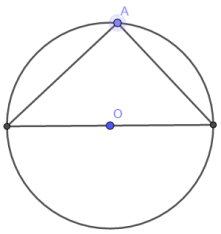
   c) Draw the figure with given measurements.



3) In figure 'O' is the centre of the circle and A is a point on the circle.

a) Find < A

b) Draw a tangent through the point 'A'.

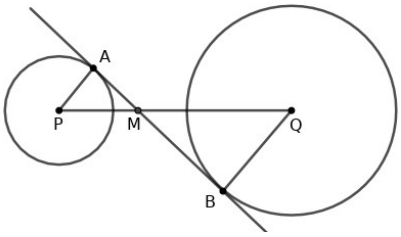


4) AB is the common tangent of two circles with centres P and Q.

a) < A=.....

b) Which is the angle equal to < AMP

c) Prove that $\frac{QM}{PM} = \frac{BM}{AM}$



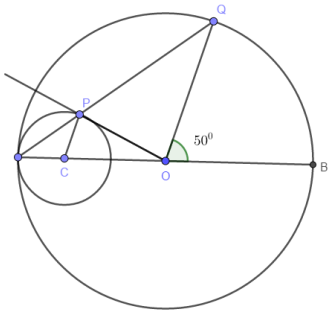
5) In the figure 'O' is the centre of the large circle. 'C' is the centre of the small circle. OP is a tangent of smaller circle, <BOQ = 50^0

a) <OAQ = ------

b) <OCP = -------

c) <APO = --------

d) <POQ = -------

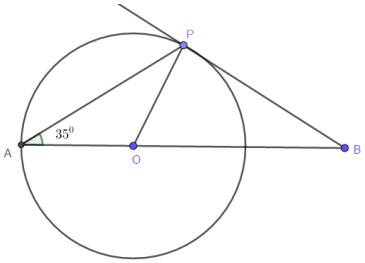


Concepts

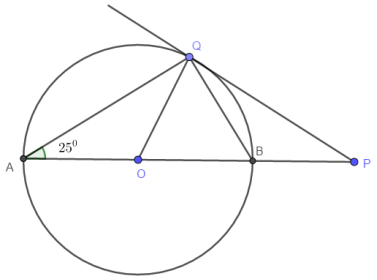
Chord and Tangents

In a circle, the angle which a chord makes with the tangent at one end on any side is equal to the angle which it makes on the part of the circle on the other side.

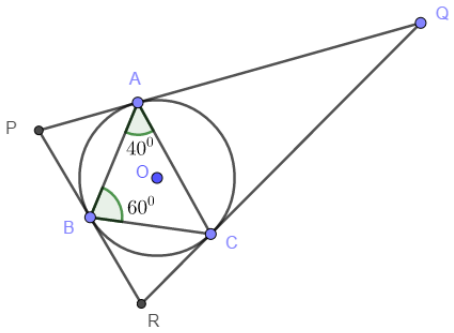
1) In the figure if <A=35^0 then find all the angles of ΔAOP and ΔBOP.



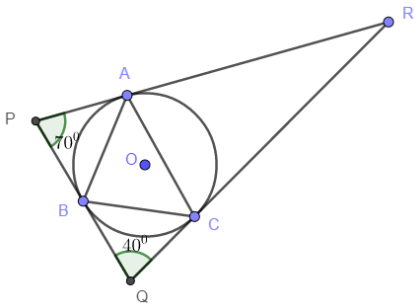
2) PQ is a tangent of the circle with centre 'O'. $< A=25^0$, Find all angles of ΔPQB



3) In the figure if $<A=40^0$, $< B= 60^0$ then find <P, <Q and <R



4) In the figure $<P=70^0$, $<Q=40^0$. Find all angles of ΔABC.

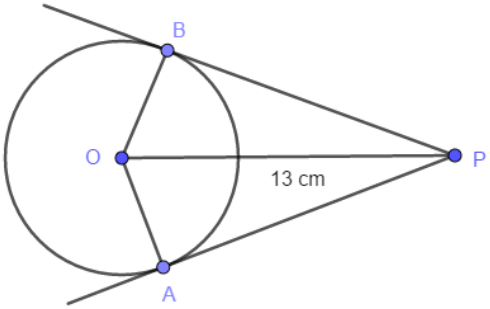


5) PA and PB are two tangents of a circle with centre 'O'. Radius of the circle is 5cm, PO=13 cm

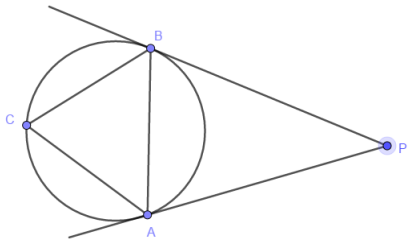
a) Find the length of PA.

b) Find the length of PB.

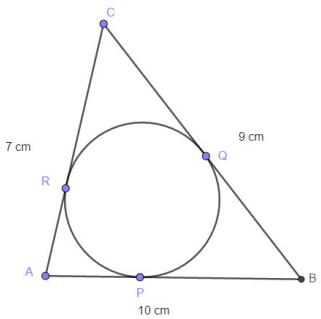
c) Find the area of the quadrilateral PAOB.



6) PA and PB are two tangents of a circle with centre 'O', $\angle C = 55^0$ .Find all angles of ΔPAB



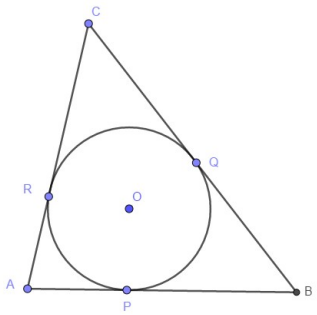
7) The triangle in the figure is obtained by drawing the three tangents of the circle. AB=10cm, BC= 9cm and AC=7 cm. Find the length of the tangents from the vertices of the triangle.



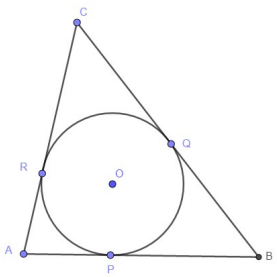
8) The circle with centre 'O' touches the sides of the triangle at the points P, Q, and R. Prove that AP+BQ+CR=PB+QC+RA

OR

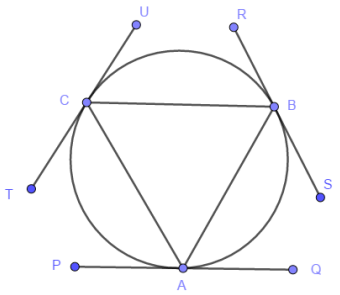
Prove that the perimeter of the triangle is $2(AP+BQ+CR)$



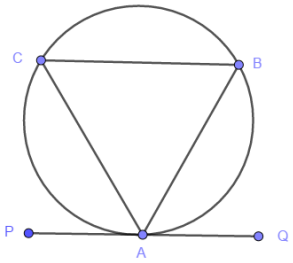
9) In the figure AP=4cm, BQ=5.5cm , CR= 2.5cm. Find all the sides of ΔABC



10) PQ, RS, TU are the tangents of the circum circle. Write any 4 equal angles.



11) If ΔABC is an equilateral triangle find <BAQ ?

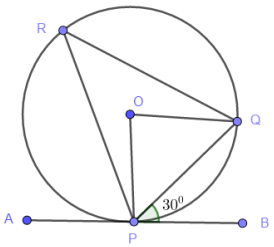


12) In the figure, AB is a tangent and <BPQ=30^0 PQ=4cm

a) Find <PRQ?

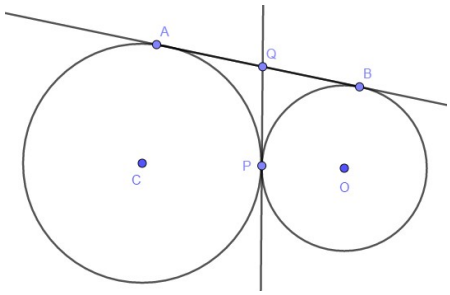
b) Find <POQ ?

c) What is the radius of the circle ?



13) Draw a circle of radius 3 cm. Mark a point 7 cm away from the centre of the circle. Draw tangents from this point to the circle, and measure the lengths of the tangents.

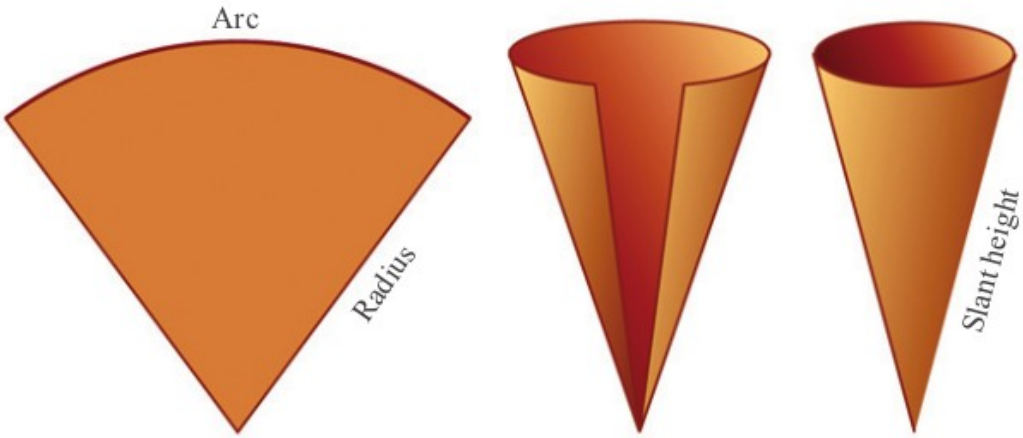
14) There are two circles which touch each other at one point. There is a common tangent passes through this point .Prove that this tangent bisect another common tangent of these circles



8

SOLIDS

Focus point: Cone



Central angle of the sector = x^0

Radius of the sector = R

Base radius of the cone = r

Slant height of cone = l

Height of the cone = h

$$x^0 \times R = 360 \times r$$

$$l^2 = h^2 + r^2$$

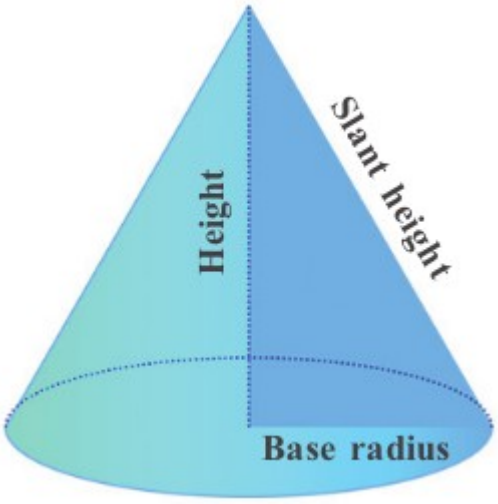
Base area of cone = πr^2

Base perimeter of cone = 2π r

Curved surface area of cone = π rl

Total surface of the cone = π r(r+ l)

Volume of cone = $\frac{1}{3}\pi r^2 h$



1) A cone is made by rolling up a sector of central angle 90^0 and radius 12 cm.
   a) Find the slant height of the cone
   b) Find the radius of the cone?

2) The slant height of a cone is 20 cm and the radius is 10cm .Find the central angle and radius of the sector used to make this cone.

3) The radius of the cone is 5cm and slant height is 13 cm. Find the height of the cone?

4) The base perimeter of a cone is 12π cm and its height is 8 cm. Find the slant height of the cone?

5) The base area of a cone is 81π square cm. Slant height is 12 cm. Find the curved surface area of the cone?

6) A sector of central angle 288^0 is cut out from a circle of radius 25 cm and is rolled up into a cone.
   a) What is the slant height of the cone?
   b) What is the radius of the cone?
   c) What is the height of the cone?
   d) Find the total surface area of the cone?

7) A paper is in the shape of a circle with radius 18cm. It is cut into 9 equal sectors.
   a) What is the central angle of each sector?
   b) What is the slant height of a cone made by rolling up one of these sectors?
   c) Find the curved surface area of such a cone?

8) The radius of a cone is 8 cm and slant height is 10 cm
   a) Find the curved surface area of the cone?
   b) Find the total surface area of the cone?
   c) Find the volume of the cone?

9) The base radii of two cones are in the ratio 3:5 and their heights are in the ratio 2:3. Find the ratio of their volumes?

10) A cylinder of height 8 cm and radius 4 cm is melted and recast in to cones of radius 2 cm and height 4 cm. How many cones can be made from this cylinder?

11) The radius of the cone is 7 cm and the slant height is 25 cm. Find the volume of the cone.

12) The central angle of a sector is 90^0 and the radius is 6 cm .Using this sector a cone is made.
   a) What is the slant height of the cone?
   b) What is the radius of the cone?
   c) What is the curved surface area of the cone?
   d) What is the height of the cone?
   e) What is the total surface area of the cone?
   f) Find the volume of the cone?

13) We have to make a cone of base radius 9 cm and height 12 cm using a sector.
   a) Find the radius of the sector
   b) Find the central angle of the sector
   c) Find the area of the sector

14) A metal sheet is in the shape of a circle of radius 12 cm. It is divided into 6 equal sectors. One of these sectors rolled up to form a cone.
   a) Find the slant height of the cone
   b) Find the radius of the circle.

15) The base radius of a cone is 15 cm and the height is 20 cm
   a) Find the total surface area of the cone?
   b) Find the volume of the cone

16) A cone is made by rolling up a sector of central angle 120^0

a) What is the ratio of radius and slant height of the cone?

b) If the curved surface area of the cone is 108 π find the radius and slant height?

17) A cone is made by rolling up a sector of central angle 144^0.What is the ratio between the radius and slant height of the cone?

18) The height of a solid cone is 12 cm and its radius is 9 cm.

a) Find the volume of the cone

b) The above solid cone is melt and recast into cones of base radius 3 cm and height 4 cm. find how many such cones can be made.

19) The base radius of a cone is 30 cm and height is 40 cm.

a) Find the base perimeter of the cone

b) Find the curved surface area of the cone

20) A cylindrical vessel and conical vessel is having same radius and height. The volume of cylindrical vessel is 27π litres. Radius of the conical vessel is 9 cm.

a) Find the volume of the conical vessel

b) What is the height both vessels?

21) The base perimeter of a cone is 16 π cm and the slant height is 17 cm

a) Find the height of the cone?

b) Find the volume of the cone?

c) Find the curved surface area of the cone?

22) Base radius and height of a wooden cone are 30 cm and 40 cm.

a) Find the slant height of the cone

b) Calculate the cost required to paint the surface of 10 such cones at the rate of 50 rupees per square meter?

23) The base radius of two cones are in the ratio 2:5 and their heights are in the ratio 3:4 .Find the ratio of their volumes?

24) The base radius of two cones are in the ratio 3:4 and their volumes are equal. Find the ratio of their heights?

25) Geethu and Neena makes cones using sectors of radius 10 cm. Geethu used the sector with angle 216^0 and Neena used the sector with angle 288^0.

a) Find the volumes of their cones.

b) What is the ratio of their volumes?

9

GEOMETRY AND ALGEBRA

Concept : Midpoint

The midpoint of the line joining (x_1,y_1) and (x_2,y_2) is $\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$

If $(x_1,y_1) = (x_2,y_2)$ then $x_1 = x_2$ and $y_1 = y_2$

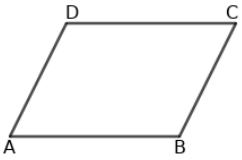
Worksheet – 1

Complete the following table using the relation between the coordinates of two end points of a line and its mid-point.

Sl.No.	Coordinates of first point	Coordinates of second point	Coordinates of Mid-point
1	(4,6)	(8,2)	$(\frac{4+8}{2}, \frac{6+2}{2}) = (6,4)$
2	(3,9)	(5,11)	
3	(0,5)	(8,-2)	
4	(-4,-3)	(6,3)	
5	(11,7)	(4,2)	
6	(3,7)		(5,8)
7	(-8,8)		(7,-6)
8		(0,6)	(5,1)
9		(9,4)	(12,5)
10	(7,-12)	(6,-5)	

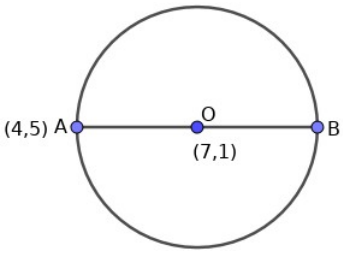
Worksheet – 2

Three vertices of parallelogram ABCD are given. Find the fourth vertex.



SL.NO.	Coordinates of A	Coordinates of B	Coordinates of C	Coordinates of D
1	(3,4)	(5,7)	(8,2)	(3+8-5,4+2-7) = (6,-1)
2	(6,2)	(5,4)	(1,-4)	
3		(7,9)	(3,-6)	(5,7)
4		(-4,5)	(5,-2)	(1,6)
5		(5,3)	(7,0)	(-2,5)
6	(9,6)		(6,2)	(-5,7)
7	(-4,8)		(-2,-3)	(6,8)
8	(7,4)		(0,5)	(9,6)
9	(1,3)	(7,-2)		(5,-4)
10	(5,5)	(6,3)		(-9,4)

Worksheet – 3



1) In the figure, O is the centre of the circle.
   a) Find the coordinates of B.
   b) Find the radius of the circle.

2) A(3,8), B(-9,-8) are points in a plane. For the circle with the diameter AB,
   a) Find the coordinates of the centre.
   b) Find the radius of the circle.
   c) Is (5,8) a point on the circle?

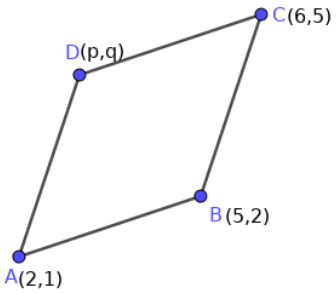
3) ABCD is a parallelogram.

a) What is the speciality of the diagonals of a parallelogram?

b) Find the mid-point of AC.

c) Find the mid-point of BD.

d) Find the values of p and q.



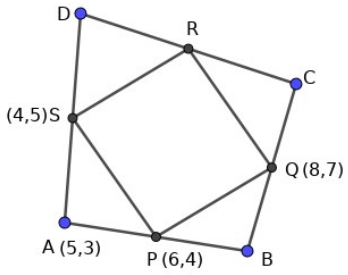
4) □PQRS is formed by joining the mid-points of the sides of □ABCD.

a) Find the coordinates of the vertices B,C and D.

b) Find the coordinates of R.

c) Find the length of the sides of □PQRS.

d) What is the suitable name of □PQRS.



Concept : Slope

Slope of a line passing through (x_1,y_1) and (x_2,y_2) is $\frac{y_2-y_1}{x_2-x_1}$

Slope of x-axis is 0.

Worksheet – 4

(x_1,y_1), (x_2,y_2) are 2 points on a line. Complete the following table.

Sl No.	Point (x_1,y_1)	Point (x_2,y_2))	Slope
1	$(5,2)$	$(4,7)$	$\frac{7-2}{4-5}$ =-5
2	$(6,1)$	$(8,5)$	
3	$(3,6)$	$(5,9)$	
4	$(7,-1)$	$(-3,-5)$	
5	$(3,8)$		$\frac{2}{3}$
6	$(-1,6)$		$\frac{1}{2}$
7	$(4,7)$		1
8		$(1,3)$	2

Worksheet – 5

Check whether the following points are on the same line.

a) $(3, 7), (5, 10), (9, 16)$

b) $(-1, 5), (4, 2), (-7, 5)$

c) $(2, 6), (1, 8), (-2,-4)$

d) $(3, 5), (9, 9), (-3, 1)$

e) $(1, 4), (5, 12), (13, 28)$

Worksheet – 6

Two points on a line are given. Find other 2 points on the same line.

a) $(2 , 7) , (3 , 10)$

b) $(-3 , 4) , (4 , 6)$

c) $(5 , 2) , (1 , 3)$

d) $(0 , 2) , (9 , 1)$

e) $(1 , 8) , (3 , 12)$

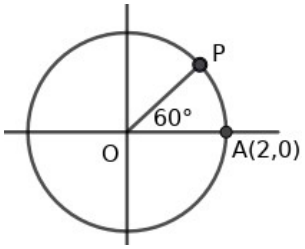
Worksheet – 7

- $A(3,4), B(7,6)$ are two points on a line.
  a) Find the slope of AB.
  b) What is the slope of the line PQ which is parallel to the line AB?
  c) $(5,1)$ is a point on the line PQ. Find another point on this line.

- If $A(5,4), B(10,6)$ and $C(-5,k)$ are three points on the same line, what is the value of k?

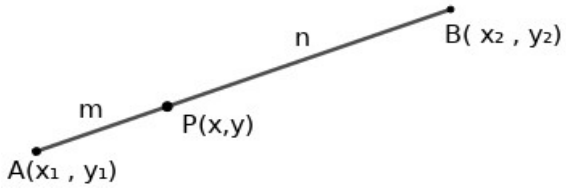
- $P(2,3), Q(7,5), R(9,8), S(4,6)$ are the vertices of a quadrilateral.
  a) Find the slopes of the sides PQ and RS.
  b) Find the slopes of the sides PS and QR.
  c) Examine the slopes and find what type of a quadrilateral is PQRS.

- $A(2,0)$ is a point on the circle with origin as its centre.
  a) What is the radius of the circle?
  b) What is the slope of OP?
  c) Find the coordinates of P.



Concepts not in the focus area

Ratio



If PA : PB = m : n then

$x = x_1 + \frac{m}{m+n}(x_2 - x_1)$ and $y = y_1 + \frac{n}{m+n}(y_2 - y_1)$

OR

$x = \frac{mx_2 + nx_1}{m+n}$ & $y = \frac{my_2 + ny_1}{m+n}$

- Equation of a line in which the slope and a point on it.
- Equation of a line with 2 of its points are given.
- Equation of a circle with its center and radius.

10

POLYNOMIAL

Focus Point

- **If p(x) = q(x) x r(x) then q(x) and r(x) are the factors of p(x)**
- **(x-a) is a factor of p(x)-p(a)**

1) a) $P(x) = x^2 - 5x + 6$, Is $(x - 2)$ a factor of P(x)?

   b) Why?

2) Check whether the first of each pair of polynomials given below is a factor of the second

   a) $x + 1; x^3 - 1$

   b) $x - 5; x^2 + 7x + 10$

   c) $x^2 - 1; x^4 - 1$

   d) $x - 2; x^3 - 6x^2 + 10x - 5$

3) $P(x) = x^2 - 7x + 11$

   a) Find the value of $P(2)$

   b) Which number subtracted from $P(x)$ to get the polynomial with $(x - 2)$ as factor?

4) Find the remainder when $2x^3 - 5x^2 + 7x + 1$ is divided by x-1 and x-2

5) Write the polynomial $P(x) = x^2 + x - 6$ as a product of two first degree polynomials

6) Find a second degree polynomial P(x) such that $P(1) = 0, P(-2) = 0$

7) a) Consider $P(x) = x^2 - 7x + 5$ .Find the remainder when P(x) is divided by $((x - 2)$

   b) Consider $Q(x) = x^2 - 5x + 7$ .Find the remainder when Q(x) is divided by (x – 2)?

c) Find the remainder when P(x) + Q(x) is divided by (x - 2)

8) Write the polynomial $P(x) = 2x^2 - 7x - 15$ as a product of two first degree polynomials.

9) What number should be added to the polynomial $P(x) = x^2 + x - 1$,so that $(x - 2)$ is a factor P(x)

10) Write the polynomial $P(x) = 6x^2 - 5x + 1$ as a product of two first degree polynomials

11) Find the value of k ,if (x-3) is a factor of the polynomial $x^3 - 2x^2 - kx + 6$.

12) If $P(x) = x^3 + 3x^2 + 7x - 15$

a) Find $P(1), P(2)$

b) Write the polynomial $P(x) - P(1)$

c) Write the polynomial $P(x) - P(2)$

13) Find the remainder when $9x^3 + 18x^2 - 4x - 10$ is divided by

a) $(3x + 2)$ and

b) $(3x - 2)$

14) Check whether 2x+3 is a factor of $2x^3 + 3x^2 + 4x + 7$

15) In the polynomial $P(x) = x^2 + ax + b$

a) If $P(3 + \sqrt{2}) = 0$, $P(3 - \sqrt{2}) = 0$,then find a and b?

b) Also find P(x)

11

STATISTICS

- **Mean** = $\frac{\text{Sum of the Given Data}}{\textit{Total number of Data}}$
- **Median = Middle value of the given list of data, when arranged in ascending or descending order**
- **a) If 'n' is odd, median is** $\left(\frac{n+1}{2}\right)^{th}$ **value.**
- **b) If 'n' is even, median is the average of** $\left(\frac{n}{2}\right)^{th}$ **and** $\left(\frac{n}{2}+1\right)^{th}$ **values.**

1) Below are the scores scored by a cricketer in 6 matches

   10, 15, 20, 22, 18, 5

   a) What is the mean of the scores

   b) If he scores 130 in the seventh match, what will be the mean?

   c) Does the mean evaluate his performance accurately?

   d) What will be the median of these scores

2) The scores of 7 students in a class are given below. Calculate the median and mean of the scores. 38, 43, 24, 42, 33, 46, 29

3) Calculate the mean and median of a given quantity

   a) 10, 12, 18, 14, 13, 11,15, 16, 11, 16, 15, 11, 14, 15, 17, 16, 14

   b) 35, 39, 32.5, 37, 40.5, 36, 33.5, 35.5, 31, 33, 32, 35

c) 2.350, 2.450, 3.250, 2.525. 3.125, 3.750, 2.850, 2.90

4) Calculate x if the mean of the dimensions 4, x and 10 is 8. What is the change in the mean if 4 is added to each dimension?

5) The mean of the first 100 odd numbers is 100. Do you agree with this comment?

6) There are 50 students in a class. 24 of them are the boys. The mean marks of boys in an examination is 18 and that of the girls is 24.Then what is the mean marks of total students in that class.

7) The average daily income of 100 workers in a factory is 115. The mean wages of men workers is 125 and that of women workers is 100. Find the number of men workers in that factory?

8) Find sum and number of terms of the numbers between 150 and 250 in the arithmetic sequence 24,27,30…..…..…...Also find the mean of those numbers.

9) The average weight of 30 children in a class is 35 Kg. When 2 children came from another class, the mean weight was 35.5Kg.If one of these children weighs 49 kg, what is the weight of the second child?

10) Calculate the medium of the measurements given below

X	2	4	5	7	8
F	3	3	2	2	1

11) Find median

Monthly income	10000	9000	7000	12000	11000	13000	8000
No. of families	13	11	3	4	7	2	5

12) Workers in a workplace are listed on a daily basis .Find the median daily wage?

Daily wages	No. of workers
250	2
300	3
350	6
400	9
450	8
500	7
550	5

13) Based on the following information, calculate the value of K, if 25 is the mean

X	5	15	25	35	45
F	3	K	3	6	2

More Questions

14) Find the median

Current charge	Number of families
0 -50	2
50 -100	6
100 - 150	15
150 - 200	20
200 -250	16
250 - 300	10
300 -350	1