

Preface

DIET Kollam has taken an initiative to translate the Ujjwalam material for mathematics prepared by Kollam Jilla Panchayath and department of Education , with the academic leadership of DIET Kollam . This material is developed for enhancing the academic level of the children and also to meet the individual differences and help students to attain higher grades . This translation from malayalam to English would surely benefit the English medium students . May I thank the faculty of CMDE ,DIET Kottarakkara ,for initiating this endeavour. Teachers are requested to make the best use of this material.

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Chapter 1 ARITHMETIC SEQUENCES

A set of numbers written as the first, second, third and so on, according to a particular rule is called a number sequence.

A sequence got by starting with any number and adding a fixed number repeatedly is called an arithmetic sequence.

This constant difference got by subtracting from any term the just previous term, is called the common difference of an arithmetic sequence.

If x_1, x_2, x_3, \dots are the consecutive terms of an Arithmetic sequence then $d = x_1 - x_2$ or $x_2 - x_1$ or $x_3 - x_2$

The difference between any two terms of an arithmetic sequence is the product of the difference of positions and the common difference.

In an arithmetic sequence, term difference is proportional to position difference; and the constant of proportionality is the common difference.

If x_m, x_n are the terms of an arithmetic sequence,

$$d = \frac{[x_m - x_n]}{m - n}$$

All terms of an arithmetic sequence leave the same remainder on division by the common difference.

The algebraic form of any arithmetic sequence is of the form $x_n = an + b$ where a and b are fixed numbers; conversely, any sequence of this form is an arithmetic sequence.

Here $f = a + b$ and $d = a$

The algebraic form of sum of first 'n' terms of any arithmetic sequence is of the form $s_n = an^2 + bn$

Here $f = a + b$ and $d = 2a$

Number of terms in an arithmetic sequence is,
 $n = \frac{[x_n - x_1]}{d} + 1$, x_n is the last term and x_1 is the first term

If a,b,c are three consecutive terms of an arithmetic sequence then

$$a+c = 2b$$

$$a+b+c = 3b$$

Sum of three consecutive terms of an arithmetic sequence = 3 x midterm

Sum of five consecutive terms of an arithmetic sequence = 5 x midterm

If the number terms is Odd , Sum of all terms = total number x midterm

If the number terms is Even, Sum of all terms = Number of pairs x Sum of an equidistant pair

eg: $x_1+x_2+x_3+x_4+x_5+x_6 = 3(x_1+x_6)$ or $3(x_2+x_5)$
 or $3(x_3+x_4)$

Sum of Odd number of terms of an arithmetic sequence having odd terms only is always odd.

Sum of Even number of terms of an arithmetic sequence having odd terms only is always odd.

Sum of some terms of an arithmetic sequence having terms as Even numbers is always even.

Sum of first 'n' terms of an arithmetic sequence having first term a perfect square and common difference is double the first term is always a perfect square.

Sum of first 'n' terms of an arithmetic sequence having common difference as double the first term, $S_n = n^2 \times$ first term

Sum of first 'n' terms and next 'n' terms of an arithmetic sequence differ by n^2d , where 'd' is the common difference.

Difference of sum of first 'n' terms and sum of any consecutive

'n' terms of an arithmetic sequence is a multiple of 'nd', where 'd' is the common difference.

If the algebraic form of an arithmetic sequence is of the form an or $an+1$, all powers of every term is also a term of this sequence.

If there is a common term in same position to two different arithmetic sequences, there will be only one such.

If 'm' times m^{th} term of an arithmetic sequence is 'n' times n^{th} term, then its $(m+n)^{\text{th}}$ term will be Zero.

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 = $n(n+1)$

Sum of first 'n' even numbers and first 'n' odd numbers are differ by 'n'.

Formulas for finding sum of consecutive terms of an arithmetic sequence

a. $S_n = \frac{n(\text{first term} + \text{last term})}{2}$

b. $S_n = \frac{n(2f + n - 1)d}{2}$

c. $S_n = \text{midterm} \times \text{number of terms}$

d. $S_n = \text{number of pairs} \times \text{sum of an equi distant pair}$

Sum of Even number of terms of an arithmetic sequence having odd terms only is always odd.

Sum of some terms of an arithmetic sequence having terms as Even numbers is always even.

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Sum of first 'n' terms and next 'n' terms of an arithmetic sequence differ by n^2d , where 'd' is the common difference.

Difference of sum of first 'n' terms and sum of any consecutive 'n' terms of an arithmetic sequence is a multiple of 'nd', where 'd' is the common difference.

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e. $S_n = \frac{d}{2} n^2 + (f - \frac{d}{2})n$

f. $S_n = \frac{1}{2} an(n+1) + bn$

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2 Mark Questions

1. Algebraic form of an arithmetic sequence is $7n+3$. Can the difference between any two terms of this sequence be 100?.
2. Write the difference between sum of first 30 Even numbers and 30 Odd numbers.
3. Second and fourth terms of an arithmetic sequence are 10 and 14 respectively.
 - a) write the third term
 - b) $\frac{8+10+\dots+16}{5} = \dots\dots\dots$
4. $x, y, 5, 7, p, q$ are the consecutive terms of an arithmetic sequence. Find the value of $x+y+5+7+p+q$
($x+y+5+7+p+q = \dots\dots\dots$)
5. Consider the arithmetic sequence 5,9,13.....
 - a) Write the next two terms.
 - b) Is 2020 a term of this sequence.
6. 5th term of an arithmetic sequence is 20 and common difference is 4
 - a) write the 6th term
 - b) write the first term
7. Show that there is no perfect square in the arithmetic sequence 8,13,18,.....
8. Sum of three consecutive terms of an arithmetic sequence is 27. find the sum of the first and last terms among these terms
9. a) Write an arithmetic sequence with first term 3 and common difference 4.
b) find the position of the term got if we added 400 to the first term.
10. Consider the arithmetic sequence 13,23,33,.....
 - a) write the common difference

- b) Identify the first 3 digit number in this sequence.
11. Algebraic expression of an arithmetic sequence is $7n+3$. Write the difference between its 20th and 10th terms.
 12. 30th term of an arithmetic sequence is zero. Sum of what number of terms becomes zero ?
 13. Can the sum of 20 consecutive even numbers be 1110 ? Justify your answer.
 14. Write an arithmetic sequence having all perfect squares.
 15. Write an arithmetic sequence having all powers of each term .
 16. Find the value of $x + y$ if $x, 5, 9, y$ are the consecutive terms of an arithmetic sequence.

3 Mark Questions

1. Find the number of two digit numbers which are multiples of 6.
2. a) $1+2+3+4+\dots\dots\dots + 10 = \dots\dots\dots$
 b) $0.1+0.2+0.3+0.4+\dots\dots\dots+1 = \dots\dots\dots$
 c) $0.1+0.2+0.3+0.4+\dots\dots\dots+10 = \dots\dots\dots$
3. Consider the arithmetic sequence $\frac{38}{9}, \frac{40}{9}, \frac{42}{9}, \dots\dots\dots$
 a) Write the Algebraic expression of this sequence.
 b) Write the first integer term in this sequence.
4. $\frac{1}{2} + 1 + 1\frac{1}{2} + 2 + 2\frac{1}{2} + \dots\dots\dots 12\frac{1}{2} = \dots\dots\dots$
5. The sum of first 7 terms of an arithmetic sequence is 49 and sum of first 17 terms is 289. find the sum of first 30 terms of this sequence
6. Consider the arithmetic sequence $-80, -76, -72, \dots\dots\dots$
 a) Write the number of terms as negative numbers .
 b) Also write the first positive integer term.

7. The sum of first 10 terms of an arithmetic sequence is 80. Find the sum of terms from 2nd position to 9th position of this sequence.
8. Consider the 10th term is 20 and 20th term is 10 of an arithmetic sequence.
 - a) Write the common difference
 - b) Write the first term ?
 - c) Find the 30th term
9. The sum of first 'n' terms of an arithmetic sequence is $5n^2+3n$.
 - a) write the first term
 - b) write the common difference
 - c) find the sum of first 10 terms
10. How much more the sum of first 20 terms of the arithmetic sequence 7,10,13than that of the sum of first 20 terms of the arithmetic sequence 5,8,11,.....
11. The sum 15th term and 20th term of an arithmetic sequence is 80. Also 28th term is 60.
 - a) write the 7th term
 - b) find the sum of first 15 terms of this sequence.
12. Consider two arithmetic sequence having common difference 6. Also given 10th term of the first sequence is 13th term of the second sequence.
 - a) Find the difference between first terms of both these sequences
 - b) Find the difference between the sums of first 18 terms of this sequences
13. The 11th term of an arithmetic sequence is 33 and 17th term is 67. Find the 14th term of this sequence
14. The sum of first five consecutive terms of an arithmetic sequence is 80. write the terms
15. There are 101 points marked in a circle. How many chords can we draw in this circle using these points?

4 Mark Questions

1. a) Find the sum of first 40 Natural numbers.
b) Find the sum of first 40 terms of the arithmetic sequence whose algebraic expression is $5n+3$.
2. a) Write the sequence of odd numbers greater than one
b) Write the algebraic expression of this sequence
c) Write the algebraic expression of the sequence
 $\frac{3}{8}, \frac{5}{8}, \frac{7}{8}, \dots$
d) Prove that the sequence $\frac{3}{8}, \frac{5}{8}, \frac{7}{8}, \dots$ doesn't contain natural numbers as terms.
3. a) Write the algebraic expression of the sequence 1,8,15, \dots
b) Write the algebraic expression of the sequence 21,27,33, \dots
c) There is a common number to these sequences at same position . Find the term position common to both
d) Is it possible to have common terms as before at more than one term positions ?
4. The sum of first 9 terms of an arithmetic sequence is 261 and sum of next 8 terms is 453.
a) find the sum of first 17 terms
b) Write the 9th term
c) find the sum of first 8 terms
d) Find the sum of terms from 2nd position to 16th position of this sequence.
5. In an arithmetic sequence , sum of terms from 2nd position to 15th position is 518.
a) Find the sum of 2nd term and 15th term
b) Find the sum of first 16 terms
6. In an arithmetic sequence , sum of 5th term and 8th term is 70 and sum of 13th term and 10th term is 130.
a) write the common difference
b) find the first term
c) Will the difference of any two terms of this sequence be 2020 ?
7. The sum of first four terms and the sum of first 9 terms is 72.
a) find the 5th term
b) find the 7th term
c) find the sum of first 13 terms

- d) write the common difference
8. Prove that the square of each term of the arithmetic sequence 4,7,10,.....is again a term of this sequence.

9. Consider the arithmetic sequence

$$(1 + \frac{1}{n}) + (2 + \frac{2}{n}) + (3 + \frac{3}{n}) + (4 + \frac{4}{n}) + \dots$$

- a) Find the sum of first 'n' terms of this sequence
b) Find the sum of first 19 terms of the arithmetic sequence

$$(1 + \frac{1}{19}) + (2 + \frac{2}{19}) + (3 + \frac{3}{19}) + (4 + \frac{4}{19}) + \dots$$

5 Mark Questions

1. Find the sum of the following
 - a) $1+2+3+\dots+100 =$
 - b) $4+5+6+\dots+103 =$
 - c) $3+6+9+\dots+300 =$
 - d) $7+11+15+\dots+403 =$
 - e) $6+8+10+\dots+100 \text{ terms} =$
2. In an arithmetic sequence, sum of 8th and 23rd term is 75.
 - a) first term + 30th term =
 - b) find the sum of first 30 terms of this sequence
 - c) find the sum of all terms from 6th term to 25th term
3. The sum of first 9 terms of an arithmetic sequence is 171 and sum of next 9 terms is 495.
 - a) Write the common difference
 - b) Write the 5th term
 - c) Write the first term
4. The sum of all terms from 5th term to 8th term of an arithmetic sequence is 70 and sum of all terms from 10th term to 13th term is 130.
 - a) Write the 9th term of this sequence
 - b) Write the 7th term
 - c) Write the common difference .
5. In an arithmetic sequence, 10th term is 20 and 20th term is 10. find the following
 - a) common difference
 - b) 30th term c) 35th term
 - d) first term e) 15th term

6. In an arithmetic sequence, 10th term is $\frac{1}{20}$ and 20th term is $\frac{1}{10}$.
find the following
- common difference
 - first term
 - algebraic expression
 - 20th term
 - sum of first 200 terms
7. Consider an arithmetic sequence of common difference 4. Also the sum of first 13 terms of this sequence is the sum of next 12 terms. Find the following
- difference between first term and 14th term
 - difference between the 12th term and 25th term
 - 13th term
 - first term.
8. Consider the arithmetic sequence 100,97,94,.....
- write the remainder when each term is divided by 3
 - write the smallest positive integer term
 - write the largest negative integer term
9. Prove that it will be a perfect square if we add 9 to sum of continuous terms from first term of the sequence 16,24,32,.....
10. In an arithmetic sequence, sum of first 9 terms is 45 and sum of first 18 terms is 171. find the following
- sum of all terms from 10th term to 18th term
 - 5th term
 - 14th term
 - sum of all terms from 5th term to 14th term
11. $\frac{2}{9}$, $\frac{3}{9}$, $\frac{4}{9}$,.....are the continuous terms of an arithmetic sequence. If we express these terms as x_1, x_2, x_3, \dots
- $x_1 + x_2 + x_3 =$
 - $x_4 + x_5 + x_6 =$
 - $x_7 + x_8 + x_9 =$
 - sum of first 9 terms
 - sum of first 150 terms
12. Consider the arithmetic sequence 5,8,11,.....Find the following

- a) sum of first 20 terms
- b) sum of terms from 2nd position to 21st position
- c) find 'm' and 'n' such that sum of terms from mth position to nth position is 1270

13. Consider the pattern below

```

2
6  10
14 18 22
.....

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- a) write the next two lines
- b) find the first term of 10th row
- c) find the last term of 10th row

14.

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          1
         2 3 4
        5 6 7 8 9
.....

```

- a) Write the next one line
- b) Write the sequence of last numbers in each row
- c) Can the difference of any two terms in the above sequence be 2020 ?

6 Mark Questions

1. Consider the sequence below

```

1
2  6
3  9  15
4 12 20 28
5 15 25 35 45
.....
.....

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In each row the first numbers are continuous natural numbers.

If we find the sum of numbers in each row,

$$\text{sum of terms in the first row} = 1 = 1^3$$

$$\text{sum of terms in the second row} = 2+6 = 8 = 2^3$$

$$\text{sum of terms in the second row} = 3+9+15 = 27 = 3^3$$

$$\text{sum of terms in the second row} = 4+12+20+28 = 64 = 4^3$$

- Write the common difference of arithmetic sequences in each row from the second row as a sequence
- Write the first term in the 10th row
- Write the common difference of arithmetic sequence in the 10th row
- find the sum of all terms in the 10th row
- find the sum of all terms in the nth row
- find the sum of first 20 terms of the arithmetic sequence
7, 21, 35, 49,.....

2. We know $1+2+3+4+\dots+\dots+\dots+n = \frac{n(n+1)}{2}$

check the number pattern below and answer the following questions

$$1^3 = 1 = 1^2$$

$$1^3 + 2^3 = 1+8 = 9 = (1+2)^2$$

$$1^3 + 2^3 + 3^3 = 1+8+27 = 36 = (1+2+3)^2$$

$$1^3 + 2^3 + 3^3 + 4^3 = 1+8+27+64 = 100 = (1+2+3+4)^2$$

we have the sum of cubes of continuous natural numbers is the square of their sum

- Find the sum first six natural numbers
- $1^3 + 2^3 + 3^3 + 4^3 + 5^3 + 6^3 = \dots\dots\dots$
- $1^3 + 2^3 + 3^3 + 4^3 + \dots\dots\dots + 10^3 = (n)^2$, find 'n'
- write $(1+2+3+4+5)^2$ as the sum of cubes of continuous natural numbers from the first
- $(1^3 + 2^3 + 3^3 + 4^3)(1+2+3+4)^2 = \dots\dots\dots$
- $1^3 + 2^3 + 3^3 + 4^3 + \dots\dots\dots + n^3 = \dots\dots\dots$

- find the sum of first 26 natural numbers
 - find the sum of first 26 odd numbers
 - find the sum of first 26 even numbers
 - find the sum of all above mentioned sums (a+b+c)
 - identify the importance of this total sum
 - if we write the prime factors of the total sum in the order of increase, first term + last term =

Chapter2

Circles

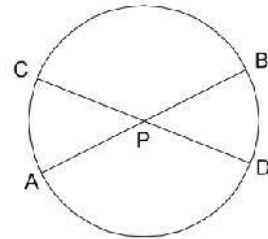
Important Points to remember

1. Angle in a semicircle is a right angle.
2. Angle outside the semicircle is less than 90°
3. Angle inside the semicircle is greater than 90°
4. An arc of an angle can make three types of angles- Angle on the arc, Angle at the centre and angle in the complement
5. Angle formed by the arc in the complement is half the angle at the centre.
6. Sum of the angles at the centre and in the complement is 180°
7. Angles on an arc (same arc) are equal.
8. If the vertices of a quadrilateral are on a circle, we call it cyclic quadrilateral.
9. The sum of the opposite angles of a cyclic quadrilateral is 180°
10. The converse of the above statement is also true. If the sum of the opposite angles of a quadrilateral is 180° . It will be a cyclic quadrilateral.
11. Square, rectangle, and isosceles trapezium are cyclic.
12. Two chords of a circle, AB and CD intersect at the point P inside the circle. It can be proved that **$PA \times PB = PC \times PD$**
13. The above relation can be used to construct a rectangle having equal area of another rectangle.
14. If the chords intersect outside the circle, the same relation holds.
 $PA \times PB = PC \times PD$
15. In the case of intersecting chords of a circle, one chord AB is the diameter of the circle and the other chord CD is perpendicular to the diameter, then **$PA \times PB = PC^2$**
16. The above relation is used to construct a square with same area of a rectangle. Also it can be used to draw the line of irrational length.

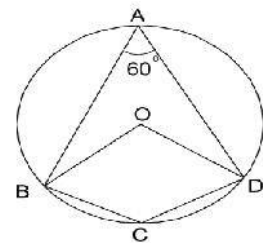
QUESTIONS

Section A (2 Mark Questions)

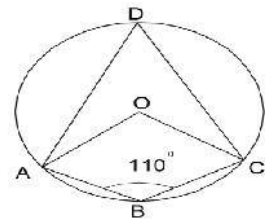
- Chords AB and CD are intersecting at P. AB = 10 cm, PB = 4cm and PD = 3cm.
 - What is the length of PA?
 - Find the length of PC.



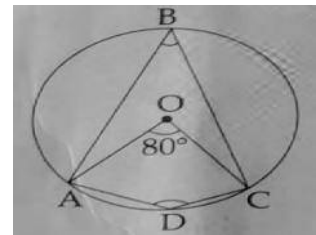
- In the figure, O is the centre of the circle, $\angle A = 60^\circ$
 - $\angle BOD = \dots\dots\dots?$
 - $\angle C = \dots\dots\dots?$



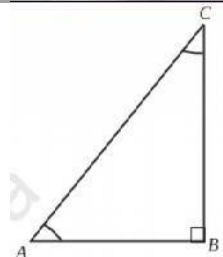
- In the figure, O is the centre of the circle, and A, B, C and D are points on it.
 - What is the measure of $\angle D$
 - What is the measure of $\angle AOC$



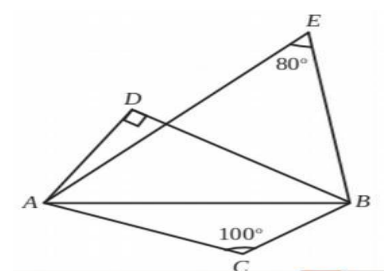
- In the figure, O is the centre of the circle. $\angle AOC = 80^\circ$
 - What is the measure of $\angle ABC$
 - What is the measure of $\angle ADC$



- In the figure, ABC is right triangle.
 - If a circle is drawn with AC as diameter, find the position of B.
 - If a circle is drawn with BC as diameter, find the position of A.



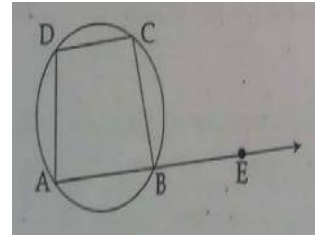
- A circle is drawn with AB as diameter, find the position of the points C, D, E related to the circle.



7. In the figure ABCD is a cyclic quadrilateral, the line AB is extended to E.

If $\angle CBE = 100^\circ$

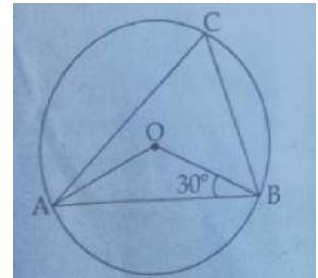
- a. $\angle CBA = ?$
b. $\angle CDA = ?$



8. In the figure, O is the centre of the circle and A, B, C are points on the circle.

If $\angle ABO = 30^\circ$

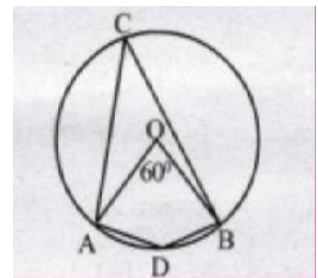
- a. $\angle OAB = ?$
b. $\angle C = ?$



9. A, B, C and D are points on a circle with centre O. If $\angle D = 40^\circ$

a) What is the measure of $\angle AOC$?

b) What is the measure of $\angle ABC$?

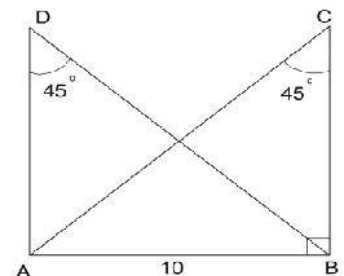


10. A circle is drawn with AB as diameter. A point C is marked inside the circle. On drawing the triangle ABC and measuring $\angle C$, Remya got 70° while Reena got 110° . Which is the correct measure of $\angle C$? Justify.

Section B (3 Mark Questions)

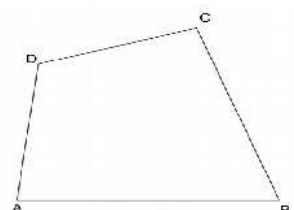
1. In the figure, $\angle ABC = 90^\circ$, $\angle C = \angle D = 45^\circ$, $AB = 10$ cm.

- a. What is the length of AC?
b. What is the radius of the circumcircle of triangle ABC?
c. What is the radius of the circumcircle of triangle ABD?



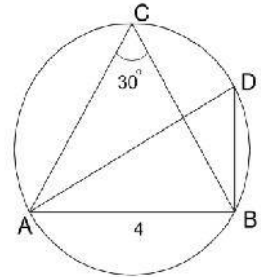
2. In the figure, ABCD is a cyclic quadrilateral. Also $\angle A + \angle D = 210^\circ$. $\angle D + \angle C = 250^\circ$

- a. What is $\angle A + \angle C$ b. Find the measure of $\angle A$ and $\angle C$



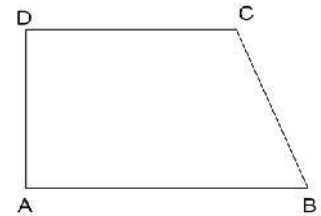
3. Draw a circle of radius 3.5 cm. Draw a triangle of angle 50° , 60° , 70° with its vertices as points on the circle.

4. In the figure, C and D are points on the circle AD is the diameter of the circle $\angle C = 30^\circ$, $AB = 4$ cm.

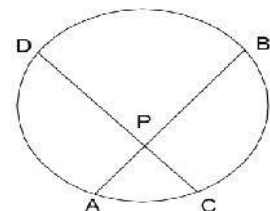


- a. $\angle D = \dots\dots\dots?$
- b. $\angle ABD = \dots\dots\dots?$
- c. What is the length of the diameter?

5. In the quadrilateral ABCD, AB and CD are parallel $\angle A + \angle C = 190^\circ$
 a. If a circle is drawn through A, B and D where will be the position of $\angle C$?
 b. If $AD = BC$, then prove that a circle can be drawn through the points A, B, C and D.

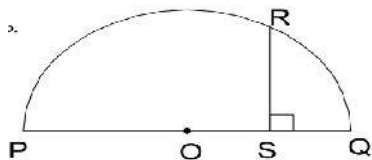


6. In the figure, AB and CD are two chords intersecting at P. If $AB = 22$ cm, $CD = 20$ cm, $PA : PB = 3 : 8$



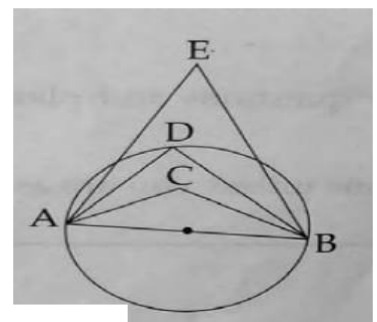
- a) Find the length of PA and PB.
- b) If $PC = x$, what is $PD = ?$
- c) Find the length of PC and PD.

7. In the figure, PQ is the diameter of the circle. RS is perpendicular to PQ. PS is 12 cm more than the length of QS.



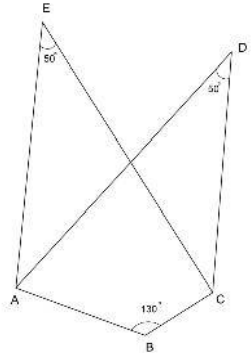
- a) If $QS = x$, Find the length of PS.
- b) What is the relation between the length of PS, SQ and SR.
- c) If $SR = 8$ cm, find the length of PQ.

8. AB is the diameter of the circle, D is a point on the circle. $\angle ACB + \angle ADB + \angle AEB = 270^\circ$. Measure of one among of $\angle ACB$, $\angle ADB$, $\angle AEB$ is 110° . Write the measures of $\angle ACB$, $\angle ADB$, $\angle AEB$.



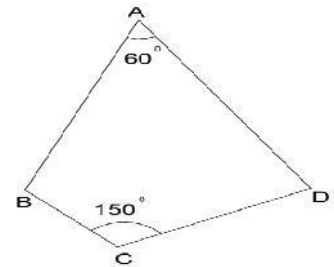
9. Draw an isosceles triangle of hypotenuse 7 cm.

10. In triangle ABC, $AB = 3\text{ cm}$, $BC = 4\text{ cm}$ and $\angle B = 90^\circ$
- If a circle is drawn with AC as diameter, the position of the point B is..... (Inside/Outside/ On the circle)
 - What is the circum radius of the triangle ABC.



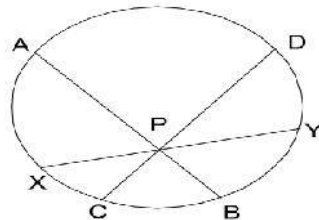
11. In the figure, $\angle AEC = 50^\circ$, $\angle ABC = 130^\circ$, $\angle D = 50^\circ$.
- $\angle EAB + \angle ECB = \dots\dots\dots$
 - Prove that ABCDE is a cyclic pentagon.

12. In the figure, $AB = AD$, $\angle A = 60^\circ$, $\angle C = 150^\circ$ Show that the circle centred at A and radius AB
- Passes through the point D.
 - Passes through the point C.

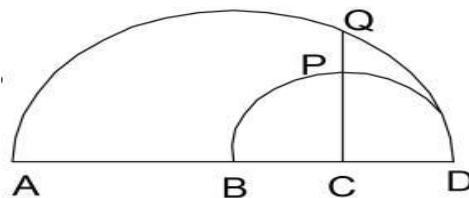


Section C (4 Mark Questions)

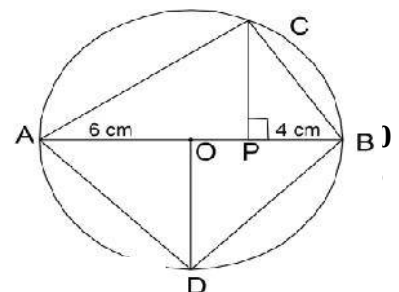
- Draw a rectangle of length 4cm and breadth 2 cm. Draw a square having the same area of the rectangle.
- In the figure, the chords AB, CD and XY intersect at P. If $AP = 9\text{ cm}$, $AB = 13\text{ cm}$, $PD = 12\text{ cm}$. Find the length of CD. If $PX = PY$ find the length of XY.



3. In the figure, $AD = 10\text{ cm}$, $BD = 6\text{ cm}$, $CD = 2\text{ cm}$. Find the length of the following
- CQ
 - CP
 - PQ

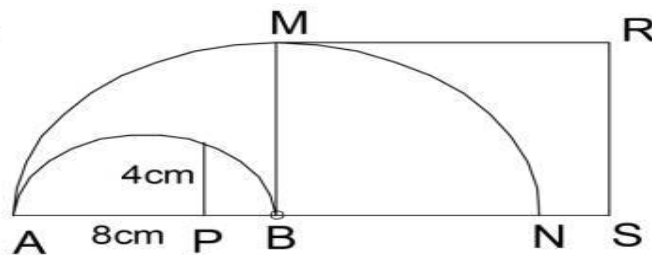


4. In the circle with centre O, AB is the diameter and PC perpendicular to AB. We know that $PA \times PB = PC^2$
- Find the length of OP



- b. Find the length of PC
- c. What is the ratio of areas of triangle PBC and APC
- d. What is the area of the quadrilateral ACBD ?

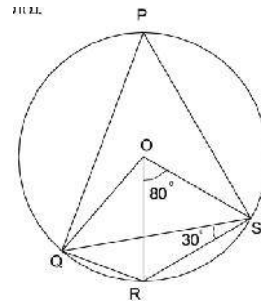
5. In the figure, the diameter of the larger semicircle is 13 cm. $AP = 8\text{cm}$ and $PQ = 4\text{cm}$.
- a. What is $PA \times PB$?
 - b. $PB = ?$
 - c. What is the radius of the smaller semicircle
 - d. What is the area of the Square BMRS ?



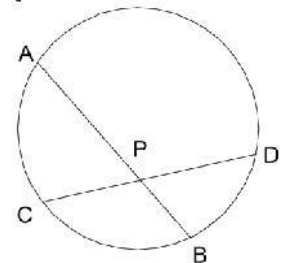
6. In the figure; P, Q, R and S are the points on the circle with

centre at O. If $\angle ROS = 80^\circ$ and $\angle QSR = 30^\circ$; Compute the following

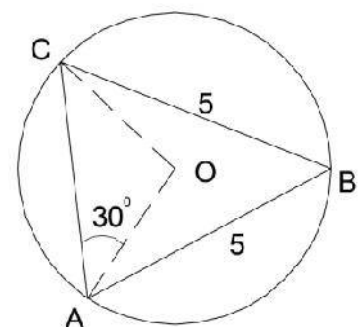
- 1. $\angle OSQ$
- 2. $\angle SQR$
- 3. $\angle P$
- 4. $\angle QOR$



7. In the figure, Chords AB and CD are intersect at P. $CP = 3\text{ cm}$, $CD = 11\text{ cm}$, $AB = 14\text{ cm}$. Find the length of AP.

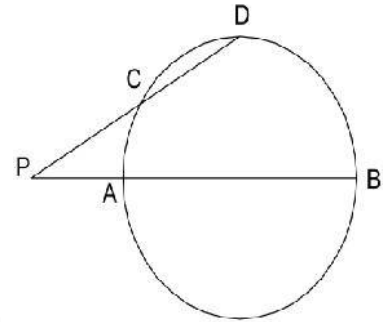


8. In the figure, O is the centre of the circle, and A, B, C are points on it. If $\angle OAC = 30^\circ$, $AB = BC = 5\text{ cm}$.

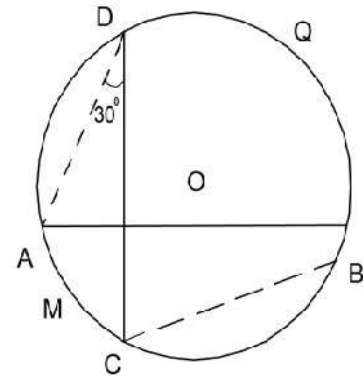


- a. What is the measure of $\angle OCA$?
- b. What is the measure of $\angle ABC$?
- c. What is the length of AC ?

9. In the figure, AB is the diameter of the circle. $PC = CD = 6$ cm. The length of PA is 3 cm less than the radius.
- a. What is the length of PD ?
 - b. Find the radius of the circle.

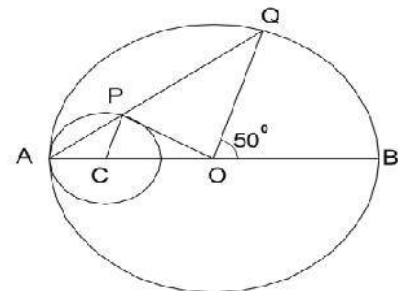


10. AB and CD are two perpendicular chords of a circle with centre O . $\angle D = 30^\circ$.
- a. What is the central angle of arc AMC ?
 - b. What is the measure of $\angle A$?
 - c. Find the sum of the central angles of arc AMC and BQD .
 - d. Is this relation true for every measures of $\angle A$ and $\angle D$. Justify.

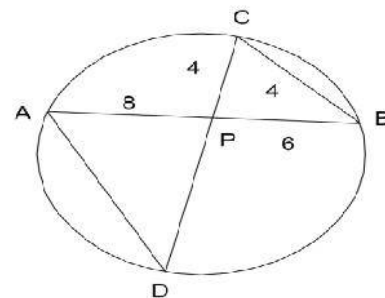


Section D (5 Mark Questions)

1. In the figure, O is the centre of the large circle. Centre of small circle is C . OP is a tangent to the small circle. $\angle BOQ = 50^\circ$.
- a. $\angle OAQ = \dots\dots$
 - b. $\angle OCP = \dots\dots$
 - c. $\angle APO = \dots\dots$
 - d. $\angle POQ = \dots\dots$

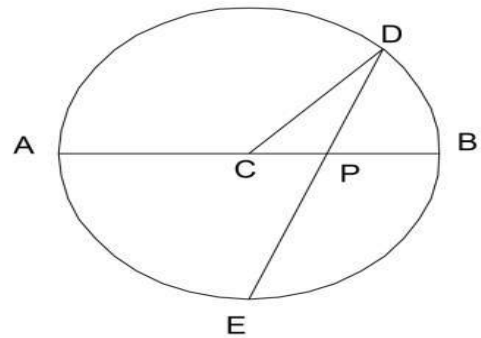


2. In the figure, chords AB and CD intersect at P . $PA = 8$ cm, $PB = 6$ cm, $PC = 4$ cm and $BC = 4$ cm
- a. Which angle is equal to $\angle A$?
 - b. Write one more pair of equal angles.
 - c. Find the length of PD
 - d. What is the length of AD ?

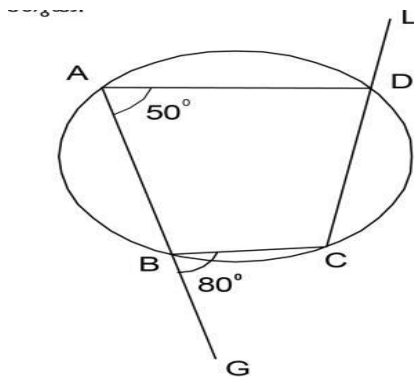


3. In the figure, C is the centre of the circle and AB, its diameter. $\triangle PDC$ is an isosceles triangle. Prove that

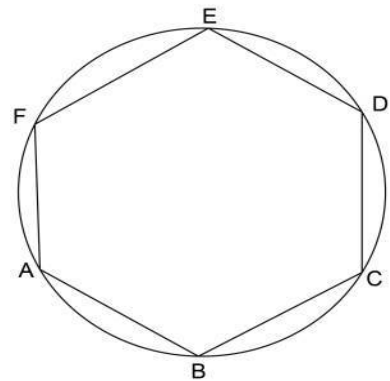
$$AB^2 = 4 PD \times DE$$



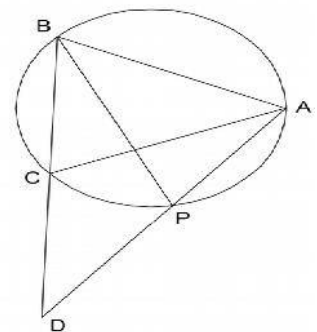
4. In the figure, quadrilateral ABCD is cyclic. $\angle GBC = 80^\circ$; $\angle A = 50^\circ$
 a) Compute the other angles of the quadrilateral. Find also $\angle ADL$
 b) Prove that the sum of the exterior angles at opposite vertices of a cyclic quadrilateral is 180°



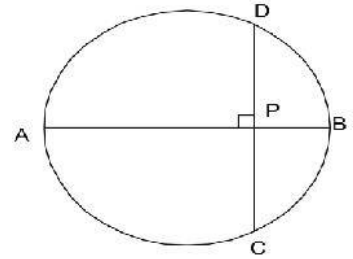
5. ABCDEF is a hexagon with its vertices on a circle. Prove that $\angle A + \angle C + \angle E = \angle B + \angle D + \angle F$



6. In the figure, $AB = AC$. The bisector of $\angle B$ intersect the circle at P. BC and AP are extended to meet at D. Prove that $CA = CD$.



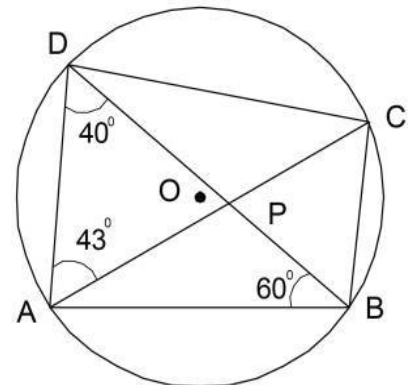
7. In the figure, AB is the diameter and CD is a chord perpendicular to AB. P is the point of intersection of AB and CD. PA = 4cm and PB = 2cm.



- a) What is the length of PD?
 b) Draw an equilateral triangle of perimeter $6\sqrt{8}$ cm.

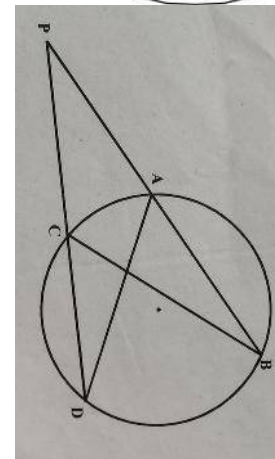
8. In the figure, O is the centre of the circle and A, B, C, D are points on it. Write the measure of the following angles.

- a) $\angle ACB$
 b) $\angle CBD$
 c) $\angle BCD$
 d) $\angle BAC$
 e) $\angle DPC$



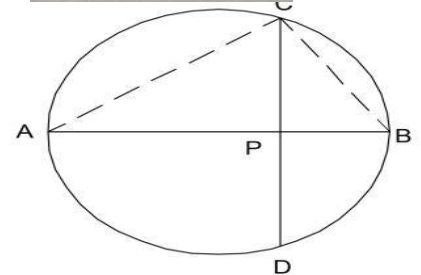
9. In the figure, the chords AB and CD are extended to meet at P.

- a) Write one pair of equal angles.
 b) Prove that $PA \times PB = PC \times PD$.



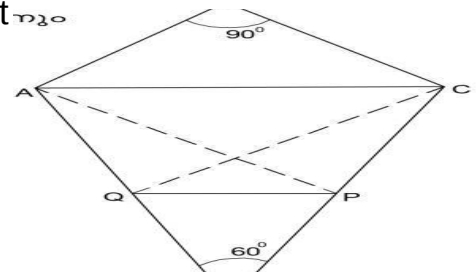
10. In the figure, AB is the diameter of the circle. CD is a chord perpendicular to AB. PA = 3 cm PB = 2 cm.

- a) $PC = ?$
 b) Find the area of the triangle ABC.
 c) Draw a rectangle with area $5\sqrt{6} \text{ cm}^2$



11. In the figure $\angle B = 90^\circ$, $\angle D = 60^\circ$.

- a) If we draw a circle with AC as diameter what will be the position of D (Inside/Outside/ On



the circle)

b) What will be the position of B.

c) If AP is the perpendicular from A to CD and CQ is the perpendicular from C to AD. Prove that ACPQ is a cyclic quadrilateral.

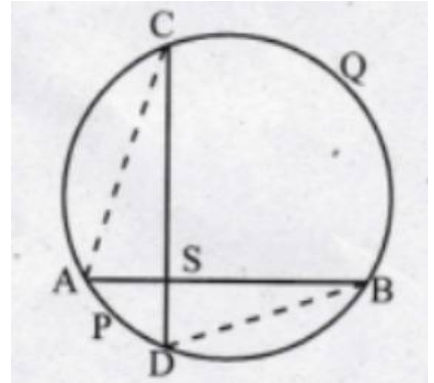
12. In the figure, AB and CD are two perpendicular chords of the circle. If $\angle C = x^\circ$.

a) $\angle B = \dots\dots\dots?$

b) $\angle D = \dots\dots\dots?$

c) What is the sum of the central angles of arc APD and arc BQC?

d) If the length of arc APD is 3cm and the length of the arc BQC is 7 cm. What is the perimeter of the circle?



Chapter 3

PROBABILITY

Part-A (2 Marks)

1. There are two boxes A and B. In box A, there are 9 white beads and 12 black beads and in box B, there are 15 white beads and 6 black beads.
 - (a) If a ball is taken from box A, what is the probability of it being white ?
 - (b) If a ball is taken from box B, what is the probability of it being black ?
2. (a) One is asked to say a two digit number. How many two digit natural numbers are there ?
 - (b) What is the probability of it being a multiple of 9 ?
3. There are some white beads and some black beads are put in a box. If the probability of drawing a white bead from the box is $\frac{3}{7}$, then what is the probability of drawing a black bead from the box ?
4. Find the probability that in a leap year the month of February will contain 5 Sundays ?
5. Even natural numbers below 9 are written in separate paper slips and put in a box.
 - (a) How many paper slips are there in the box ?
 - (b) When a slip is taken from the box, what is the probability of getting a prime number ?

Part-B (3 Marks)

1. There are two covers A and B; each contain paper slips with natural numbers from 1 to 5 written on them. One slip is drawn from each cover. Using them, a two digit number is formed with the number from A in the unit place and the number from B in the tenth place.

(a) How many such two digit numbers can be formed ?

(b) What is the probability that a two digit number so formed is even ?

2. There are 36 beads in a box, some white and some black. The probability of drawing a white bead from it is $\frac{1}{3}$.

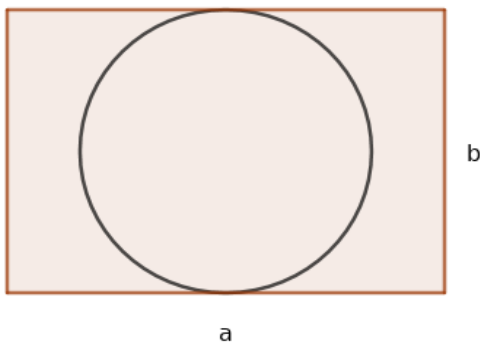
(a) How many white beads are there in the box ?

(b) How many black ?

(c) How many black beads should be removed to make the probability of

drawing a white bead $\frac{1}{2}$?

3. In the figure 'a' is the length and 'b' is the breadth of the rectangle.



(i) What is the area of the circle in the figure ?

(ii) If we put a dot inside the rectangle without looking into it, what is the probability that it will be inside the circle?

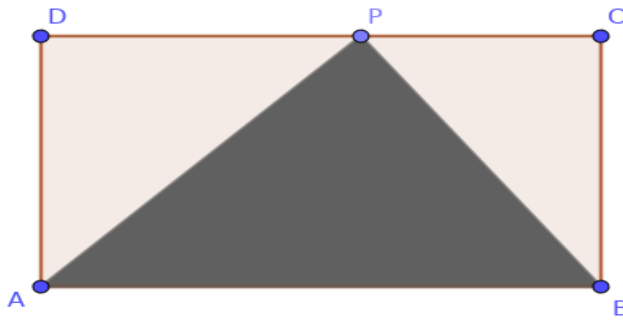
4. One is asked to say a two digit number. (a) What is the probability of

it being an odd number ?

(b) What is the probability of both digits being the same ?

(c) What is the probability of the sum of the digits being 10 ?

5. In figure, a triangle of maximum size is drawing inside a rectangle.



If we put a dot inside the rectangle without looking into it, what is the probability that it will be

(a) inside the triangle ?

(b) Outside the triangle?

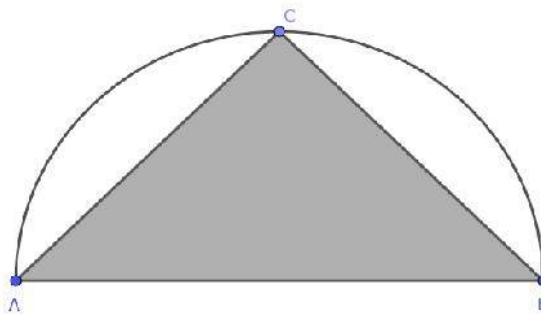
6. There are 20 beads in a box, some white and some black. The probability of drawing a black bead is known to be $\frac{1}{4}$.

(a) How many black beads are there in the box ?

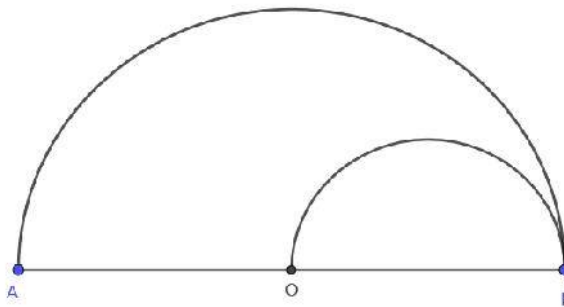
(b) How many White ?

(c) If one black bead is removed, what would be the probability of drawing a black from the remaining beads ?

7. ABC is an isosceles right angled triangle in a semicircle of diameter AB



8. (a) If the radius of the circle is r , then what is the area of the triangle ?
 (b) Calculate the probability of a dot, put without looking, be within the triangle ?
9. There are two boxes. Each box contains paper slips with natural numbers 1 to 10 are written on them. If one slip is drawn from each box.
 (a) What is the probability of both being even ?
 (b) What is the probability of both being prime ?
10. (a) Find the probability that a non leap year will contain 53 Sundays ?
 (b) Find the probability that a leap year will contain 53 Sundays ?
11. There are two semi circles in the figure. O is the centre of the larger circle.

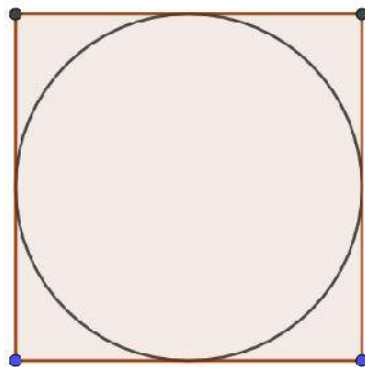


- (a) If the radius of the smaller circle is r , then what is the radius of the larger circle ?
 (b) If we put a dot inside the figure without looking into it, what is the probability that it will be inside the smaller semicircle ?

Part-C (4 Marks)

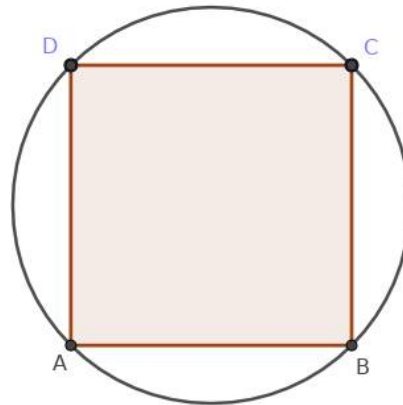
12. A box contains 7 white, 5 black and 3 red beads. If a bead is taken from it,
 (a) what is the probability of it being white ?
 (b) what is the probability of it being black ?
 (c) what is the probability of it being red
 (d) what is the probability of it being not black ?

13. One is asked to say a three digit number.
- What is the probability of all the three digits being same?
 - What is the probability that the number is a multiple of 6 ?
14. Prime numbers less than 20 are written in paper slips and put in a box. All natural numbers upto 10 are written in another set of paper slips and put in a second box.
15. (a) How many slips are there in the first box ?
- How many slips in the second box have prime numbers on them ?
 - If one slip is drawn from each box, what is the probability of both being primes
16. In class 10 A there are 25 boys and 25 girls and in class 10 B, there are 30 boys and 20 girls. One student from each class is to be selected for participation in the Math Fair.
- What is the probability of both being boys ?
 - What is the probability of both being girls ?
 - What is the probability of one being a boy and the other a girl ?
 - What is the probability of at least one being a girl ?
17. In the figure, a circle of maximum size is drawn inside a square.
- If the radius of the circle is r , then what is the length of each side of the square ?
 - If we put a dot inside the figure without looking into it, what is the probability that it will be inside the circle ?



18. There are 18 beads in a box, some white and some black. The probability of drawing a black bead from it is $\frac{1}{3}$.
- (a) How many black beads are there in the box ?
- (b) How many white ?
- (c) How many white beads should be added to make the probability of drawing a black bead $\frac{1}{4}$?
19. A box contain 200 beads of different colours. One bead is taken at random. The probability that it is blue is 0.98 then
- (a) How many blue beads are there in the box ?
- (b) Some blue beads are removed from the box, now probability of a blue bead becomes 0.96. So how many blue beads are removed ?
20. A box contains some white and blue balls. 15 red balls are added to that box and then a ball is taken from it. The probability of that ball being red is $\frac{15}{32}$ and the probability of it being blue is $\frac{1}{4}$.
- (a) What is the total number of balls in the box ?
- (b) What is the number of blue balls in the box ?
- (c) What is the probability of getting a white ball from the box ?
- (d) What is the number of white balls in the box ?
21. From all two-digit numbers with either digit 1, 2, 3, 4 or 5 one number is chosen :
- (a) what is the probability of both digits being same ?
- (b) what is the probability of sum of the digits being 8 ?
- (c) what is the probability of the number is a multiple of 5?

22. A square of maximum size is drawn inside a circle.



- (a) If the radius of the circle is r , then what is the area of the square ?
 (b) If we put a dot inside the figure without looking into it, what is the probability that it will be inside the square ?
 (c) Outside the square ?

Part-D (5 Marks)

1. There are 50 mangoes in a basket, 20 of which are ripe. Another basket contains 60 mangoes, with 30 ripe. If we take one mango from each basket, what is the probability of

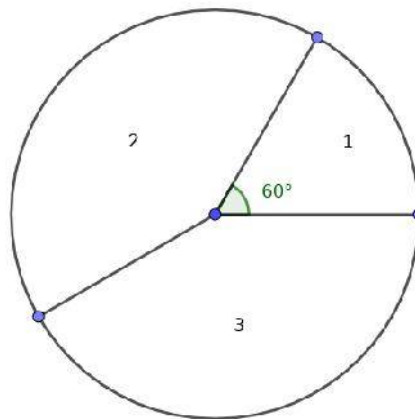
- (a) both being ripe ?
 (b) both being unripe ?
 (c) one ripe and one unripe ?
 (d) at least one being ripe ?
 (e) at least one being unripe ?

2. A box contains three slips numbered 2, 3, 5 and another box contains four slips numbered 2, 5, 6, 9. If one slip is taken from each. What is the probability of

- (a) both being odd ?
 (b) both being even ?

- (c) both being prime ?
 (d) one odd number and one even number ?
 (e) both being same ?

3. The circle with centre O is divided into three sectors as shown in the figure. Central angle of the first sector is 60° . If we put a dot inside the circle without looking into it.



- (a) What is the probability of the dot to be in the first sector ?
- (b) If the probability of the dot to be in the second sector is $\frac{5}{12}$, what is its central angle ?
- (c) What is the central angle of the third sector ?
- (d) What is the probability of the dot to be in the third sector ? ?

4. In a school the total number of students in 10 A division is equal to the total number of students in 10 B. One student is to be selected from each division. Number of boys in 10 A is 25. The probability of selecting a boy from 10 A

is $\frac{1}{2}$ and that of 10 B is $\frac{2}{5}$.

- (a) How many students are there in 10 A?
 (b) What is the probability of selecting a girl from 10 B ?

- (c) How many girls in 10 B ?
- (d) What is the probability of both the selected students being boys ?
- (e) What is the probability of at least one selected student being a girl ?

5. A box contains 8 black beads and 12 white beads. Another box contains 9 black and 6 white. One bead from each box is taken.

- (a) What is the probability of both beads are black ?
- (b) What is the probability of both beads are white ?
- (c) What is the probability of one black and one white ?
- (d) What is the probability of at least one white bead ?
- (e) *What is the probability of at least one black bead ?*

Chapter 4
Second Degree Equations

- * The general form of a second degree equation is $ax^2 + bx + c = 0$, $a \neq 0$
- * Add square of half of the coefficient of x , i.e. $(\frac{b}{2})^2$ to the second degree polynomial $x^2 + bx$, then the polynomial become a perfect square.
- * The solutions of the equation $ax^2 + bx + c = 0$ is given by

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

- (i) If $b^2 - 4ac > 0$ (i.e. positive), then the equation has two distinct solutions
- (ii) If $b^2 - 4ac = 0$, the equation has equal roots
- (iii) If $b^2 - 4ac < 0$ (i.e. negative), the problem has no solution.

Part-A (2 Marks)

1. If the sum of first n odd natural numbers is 100, then find the value of n ?
2. 5 subtracted from a natural number, square of the resulting number is 2500. What is the number ?
3. If the solutions of the equation $x^2 + kx + 25 = 0$ are equal. Find the value of k .
4. What are the solutions of the equation $x^2 - 6x - 40 = 0$?
5. If x is a natural number, what number is to be added to $x^2 + 12x$ to get a perfect square?
6. If $x^2 + kx + 9$ is a perfect square, then find the value of k ?
7. If the equation $x^2 - 8x + k = 0$ has only one solution. Find the value of k .
8. When each side of a square was reduced by 2 metres, the area became 49 square metres. What was the length of a side of the original square ?

9. Anu is x years old while her mother Veena is x^2 years old. Five years hence Veena will be three times old as Anu. Write down a second degree equation expressing the facts given.

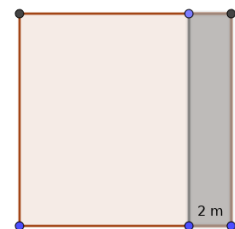
Part-B (3 Marks)

10. The algebraic form for the sum of first n terms of an arithmetic sequence is $2n^2 - 4n$. How many consecutive terms of the sequence, starting from the first, are to be added to get 160 ?
11. The length of a rectangle is 4 cm more than its breadth and the area of the rectangle is 525 square centimetre. Find the length and breadth of the rectangle.
12. (a) If $x - 1$ is an odd number, which is the next odd number ?
(b) Prove that the product of two consecutive odd numbers added to 1 gives a perfect square.
13. A 34 cm long wire is bent into a rectangle. The length of its diagonal is 13 cm. What are the lengths of the sides of the rectangle ?
14. 40 times of a natural number is added to its square gives 2100. What is the number ?
15. Can we draw a rectangle with perimeter 40 cm and area 120 square cm ? Justify your answer.
16. In the polynomial $p(x) = x^2 + 12x$, what number should we take as x to get $p(x) = 589$?
17. The length of a rectangle is 3 metre more than its breadth. The perimeter and area of this rectangle is numerically equal. What is the length breadth of the rectangle ?

18. In copying a second degree equation to solve it, the coefficient of x was written as 10 instead of -10 . The answers found were $-6, -4$.
- (a) Write the equation which is wrong ?
- (b) What is the correct equation ?
- (c) What are the answers of the correct problem ?

Part-C (4 Marks)

19. (a) Find the sum of first 20 natural numbers.
 (b) Sum of first n natural numbers is 528. What number is n ?
20. The product of two consecutive terms of the arithmetic sequence 5, 8, 11,is 598.
 (a) Find the terms multiplied.
 (b) Find the positions of the terms multiplied.
21. The product of two odd numbers is 675.
 (a) If one number is taken as x , then what is the other number ?
 (b) Write down a second degree equation expressing the facts given.
 (c) What are the numbers ?
22. Land is acquired for road widening from a square ground, as shown in the figure. The width of the acquired land is 2 metres. Area of the remaining ground is 575 square metres .
 (a) What is the shape of the remaining ground ?
 (b) What is the length of the remaining ground ?
23. Honey is twice as old as her sister. Four years hence, the product of their ages will be 160. Find their present ages.
24. The sum of the numbers giving the perimeter and area of a square is 221.



- (a) Taking the length of a side of the square as x , write down a second degree equation expressing the facts given.
- (b) Solve the equation to find the length of a side of the square.
25. In copying a second degree equation to solve it, the term without x was written as -15 instead of -35 . The answers found were $-5, 3$.
- (a) Write the equation which is wrong ?
- (b) What is the correct equation ?
- (c) What are the answers of the correct problem ?
26. In a right angled triangle, one of the perpendicular sides is 6 cm longer than the other side. If the area of the triangle is 36 square centimetre, find the length of its perpendicular sides.
27. The length and breadth of a rectangle are 20 cm and 4 cm respectively.
- (a) Calculate the perimeter and area of the rectangle.
- (b) When a new rectangle is formed by changing the length and breadth, its perimeter decreased by 8 cm and area increased by 16 square cms. Find the change in its length and breadth.

Part-D (5 Marks)

28. A rope of length 40 metres is cut into two pieces and two squares are made on the floor with them. The sum of the areas enclosed is 58 square meter.
- (a) If the length of one piece is taken as $4x$, what is the length of the other piece ?
- (b) What are the lengths of the sides of the squares ?
- (c) Write the given fact about area as an algebraic equation.
- (d) What is the length of each piece ?
29. Consider the arithmetic sequence $6, 10, 14, \dots$

- (a) Find the sum of first n terms of the sequence ?
- (b) How many consecutive terms of the sequence , starting from the first, are to be added to get 240 ?
- (c) Can the sum of first few consecutive terms of this sequence be 250 ?
Why ?

30. The one's place of a two digit number is 4. The product of the number and its digit sum is 144.
- (a) If ten's place digit is taken as x , write the number.
 - (b) Frame a second degree equation and find the number.

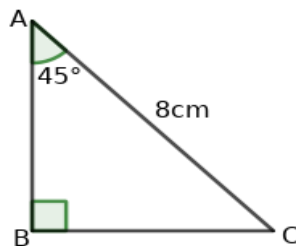
CHAPTER 5

TRIGONOMETRY

PART A - 2 mark questions

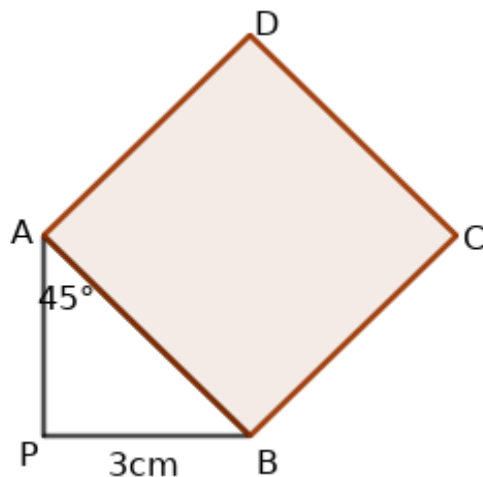
1. In the figure, $\angle A = 45^\circ$, $AC = 8\text{cm}$, then

- find the length of AB ?
- write the ratio of the sides.

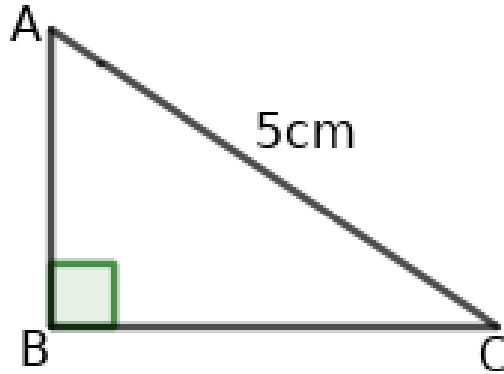


2. In the figure, APB is a right triangle and $ABCD$ is a square. $PB = 3\text{cm}$, $\angle PAB = 45^\circ$, then

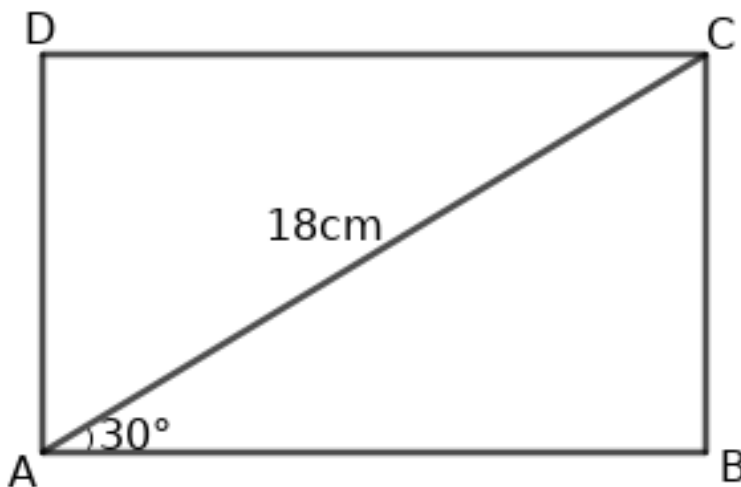
- find the length of AB ?
- find the area of the square $ABCD$?



3. In the figure, ABC is a right triangle. $\angle B = 90^\circ$, $AC = 5\text{cm}$, $\sin A = \frac{4}{5}$. Then, find the lengths of BC and AB.

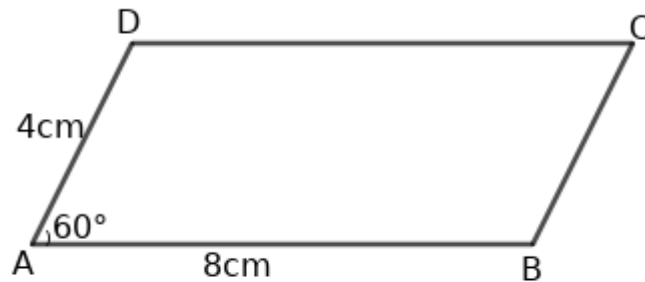


4. In the figure, ABCD is a rectangle. Length of its diagonal is 18 cm. Angle made by the diagonal with one side of the rectangle is 30° . Then,
a) find the breadth of the rectangle?
b) find its length?

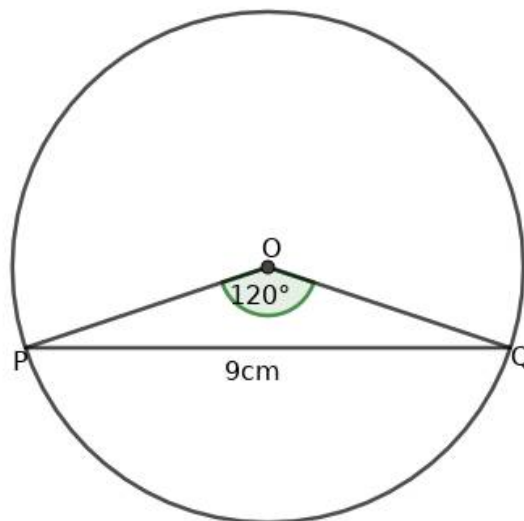


5. In the figure, the sides of the parallelogram ABCD are 8cm and 4cm. $\angle A = 60^\circ$, then

- find the perpendicular distance between the top and bottom sides ?
- find the area of the parallelogram?

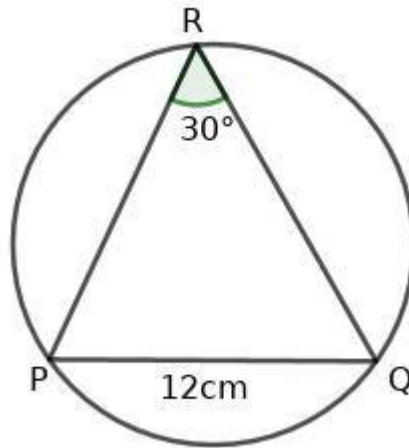


6. In the figure, $\angle POQ = 120^\circ$, $PQ = 9\text{cm}$.



- How much times the radius is equal to the length of PQ?
- Find the radius of the circle?

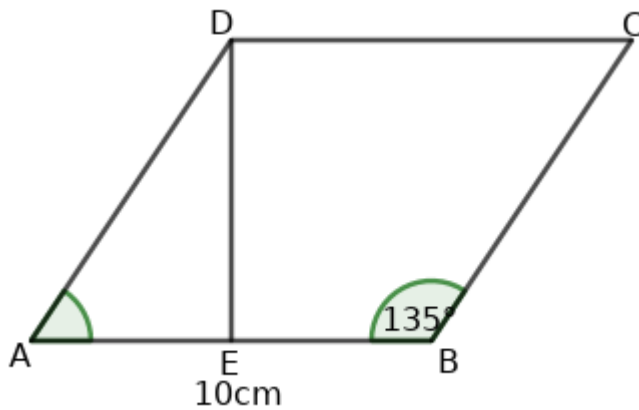
7. In the figure, $\angle R = 30^\circ$, $PQ = 12\text{cm}$. Find the radius of the circle?



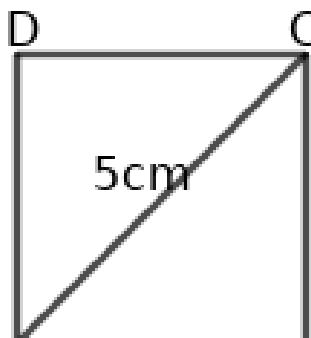
8. In the figure $ABCD$ is a rhombus. $AB = 10\text{cm}$, $\angle B = 135^\circ$.

a) Write the measure of $\angle A$?

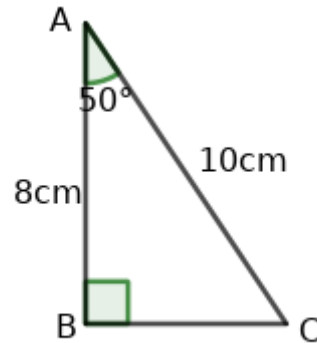
b) Find the length of DE ?



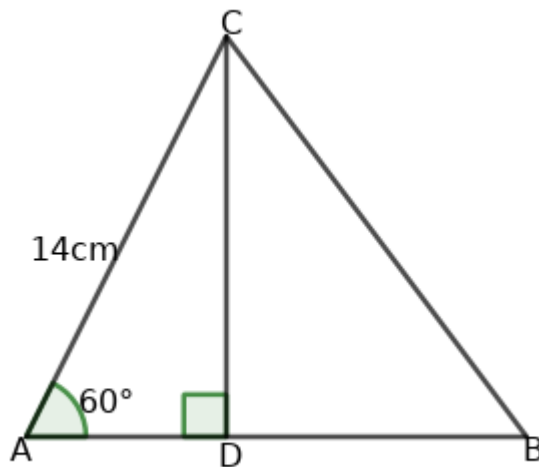
9. In the figure, the length of the diagonal of a square $ABCD$ is 5cm . Find the perimeter of the square



10. In the figure, $\angle B = 90^\circ$, $\angle A = 50^\circ$, $AC = 10\text{cm}$, $AB = 8\text{cm}$, then,
 a) Find the length of BC ?
 b) Find $\sin 50^\circ$?

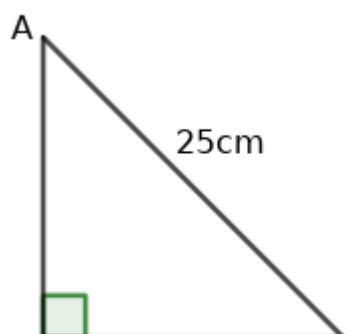


11. In the figure, $AC = 14\text{cm}$, $\angle A = 60^\circ$, then,
 a) find the length of CD ?
 b) If D is the midpoint of AB , then find the area of triangle ABC ?



PART B - 3mark questions

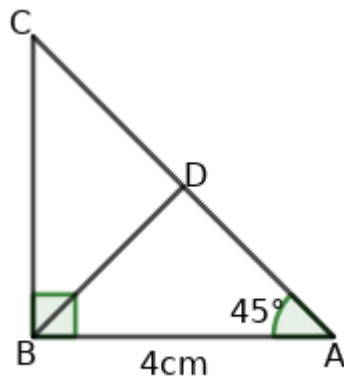
1. In the figure, $AC = 25\text{cm}$, $BC = 15\text{cm}$, then,



- a) find the length of AB ?
 b) find $\sin A$ and $\cos A$?

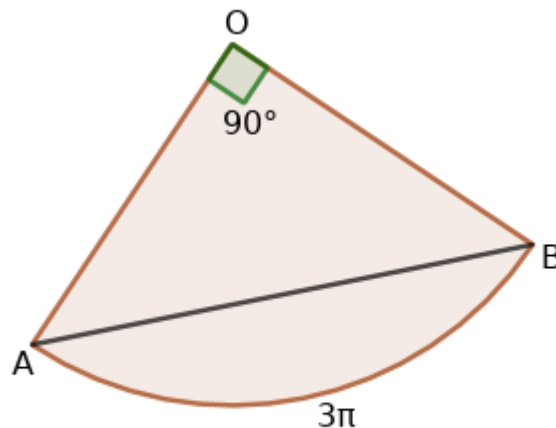
2. In the figure, ABC is a right angled triangle. $AB = 4\text{cm}$, $\angle A = 45^\circ$. Also D is the midpoint of AC, then

- find the length of BC?
- find the length of AC?
- find the length of BD?



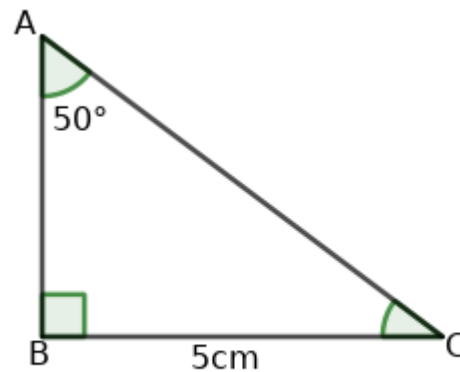
3. A copper sheet in the shape of a sector is given below. The length of the arc AB is $3\pi\text{cm}$. Then

- Find the radius of the sector?
- Find the length of the chord AB?



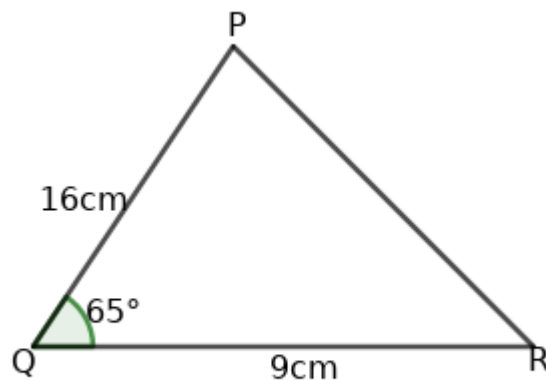
4. In triangle ABC $\angle A = 50^\circ$, $BC = 5\text{cm}$ ($\sin 40^\circ = 0.64$, $\cos 40^\circ = 0.76$, $\tan 40^\circ = 0.84$)

- Find the measure of $\angle C$?
- Find the length of AB ?
- Find the area of triangle ABC ?



5. Two sides of a triangular shaped card are 10cm and 8cm . Angle between these two sides is 130° . Then find the area of the card board sheet? ($\sin 50^\circ = 0.76$, $\cos 50^\circ = 0.64$, $\tan 50^\circ = 1.19$)

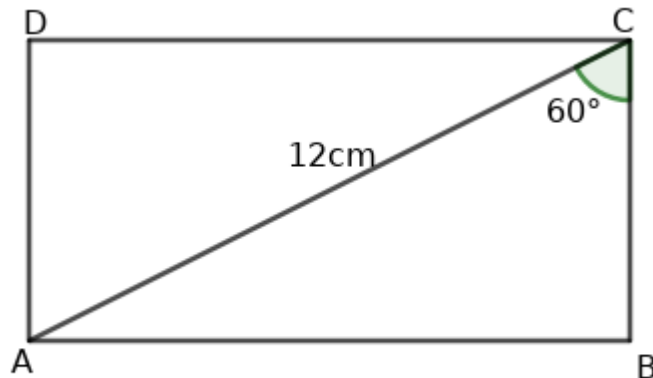
6. In figure, $PQ = 16\text{cm}$, $QR = 9\text{cm}$, $\angle Q = 65^\circ$, then find the area of triangle PQR? ($\sin 65^\circ = 0.9$, $\cos 65^\circ = 0.42$, $\tan 65^\circ = 2.1$)



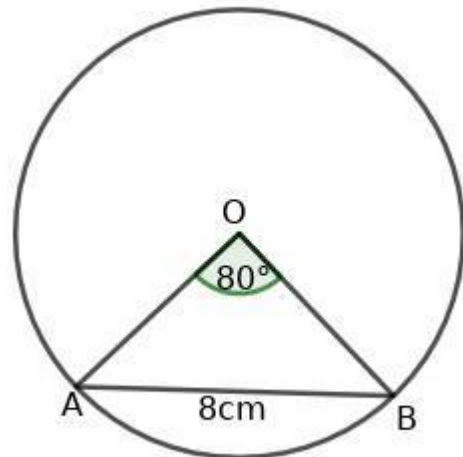
7. In the figure ABCD is a rectangle and the length of the diagonal is 12cm . Angle made by the diagonal with one side is 60° then,

- Find the length of the rectangle ?
- Find the breadth of the rectangle ?

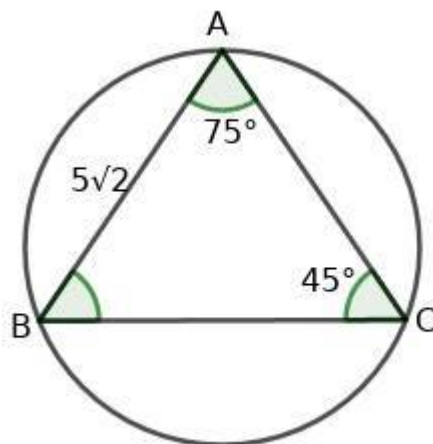
c) Find the area of the rectangle ?



8. AB is a chord of the circle with centre O. $\angle AOB = 80^\circ$. $AB = 8\text{cm}$. Find the diameter of the circle ? ($\sin 40^\circ = 0.64$)



9. In the figure, $\angle A = 75^\circ$, $\angle C = 45^\circ$ then,
 a) Find the measure of $\angle B$?
 b) If $AB = 5\sqrt{2}$ then find the diameter of the circle?



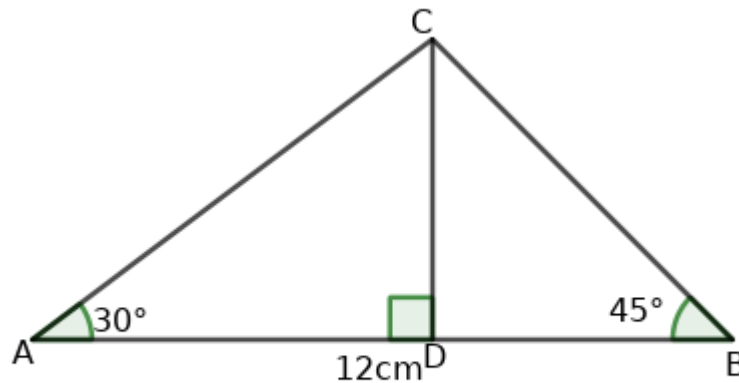
10. In triangle ABC $\angle A = 30^\circ$, $\angle B = 45^\circ$, $AB = 12\text{cm}$.

a) If the length of CD is “ x “ then what is the length of AD ?

What is DB ? What is AC ?

b) Find the length of perpendicular from C to AB ?

c) Find the area of triangle ABC?



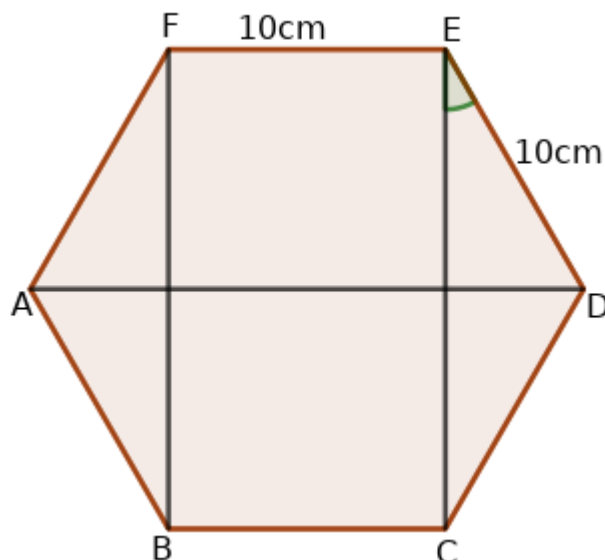
PART C 4 mark questions

1. A regular hexagon is formed by joining two isosceles trapeziums as shown in the figure. Length of the sides of the hexagon is 10cm..

a) Write the measure of $\angle DEC$?

b) Find the length of EC ?

c) Find the area of the rectangle BCEF ?



2. In the figure, $\angle B = 90^\circ$, $\angle C = 38^\circ$.

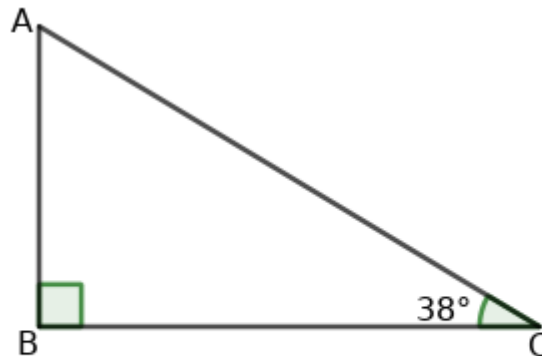
a) Find the measure of $\angle A$?

b) Among the following which is $\tan 38^\circ$?

$$\left(\frac{BC}{AB}, \frac{AB}{BC}, \frac{AB}{AC}, \frac{BC}{AC} \right)$$

c) Prove that $\tan 38^\circ \times \tan 52^\circ = 1$

d) If $\sin 38^\circ = \cos x$ then, find x ?

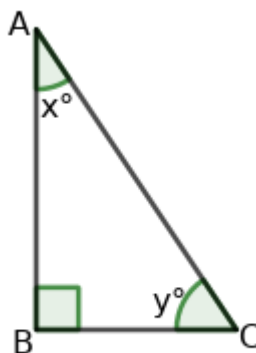


3. In the figure, $\angle B = 90^\circ$,

$\angle A = x^\circ$, $\angle C = y^\circ$ then

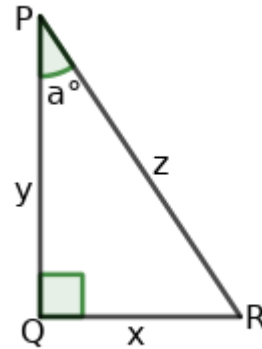
a) Write $\sin x$, $\cos x$, $\tan x$.

b) Write the relation between $\sin x$, $\cos x$ and $\tan x$.



4. In the figure $\angle Q = 90^\circ$, $\angle P = a^\circ$. then

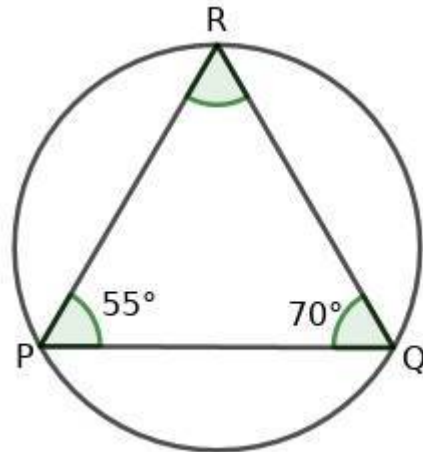
- Find $\sin a^\circ$, $\cos a^\circ$.
- Prove that $\frac{\sin a^\circ}{\cos a^\circ} = \tan a^\circ$
- If $\sin a^\circ = \cos a^\circ$ then, find a ?



5. In the figure, circumcircle of triangle PQR is drawn. circumdiameter is 7cm.

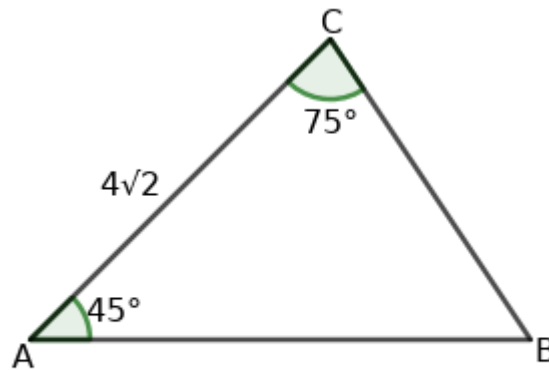
$\angle P = 55^\circ$, $\angle Q = 70^\circ$ then,

- $\angle R = \text{---}$
 - Find the length of PQ?
 - Find the length of QR?
 - Find the length of PR?
- ($\sin 55^\circ = 0.82$, $\sin 70^\circ = 0.94$)

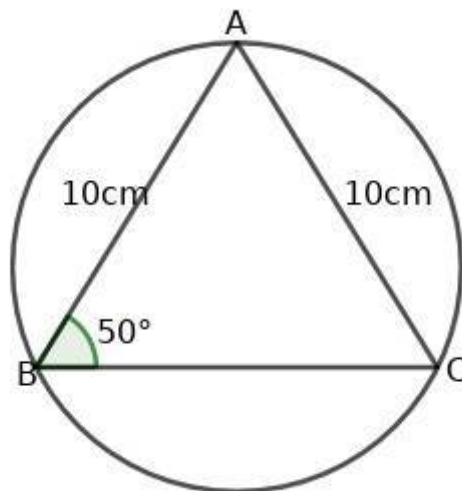


6. In the given triangle $\angle A = 45^\circ$, $\angle C = 75^\circ$, $AC = 4\sqrt{2}$ cm

- Find the perpendicular distance from C to the side AB?
- Find the length of AB?
- If the angles of a triangle are in ratio 3:4:5, then find the ratio of its sides?

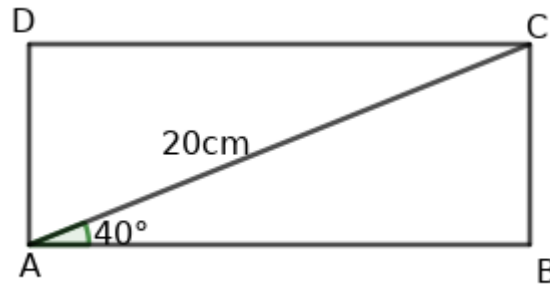


7. In the figure, $AB = AC = 10\text{cm}$. $\angle ABC = 50^\circ$. Then,
- Find the length of BC ?
 - Find the diameter of the circle ?
- ($\sin 50^\circ = 0.77$, $\cos 50^\circ = 0.64$, $\tan 50^\circ = 1.19$)



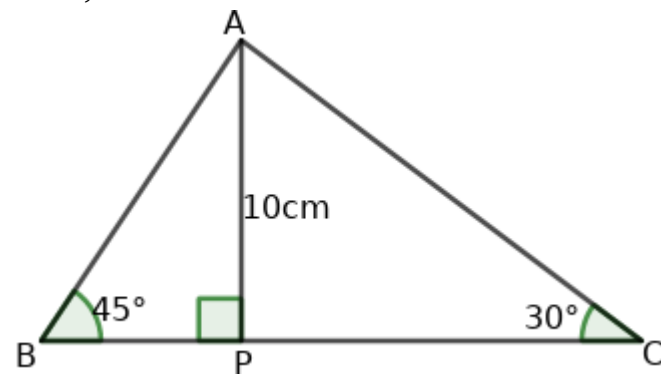
8. In figure, the length of the diagonal of a rectangle ABCD is 20cm . Angle made by the diagonal with one side is 40° . then ,
- Find the breadth of the rectangle?
 - Find the length of the rectangle ?
 - Find the perimeter of the rectangle?
 - Find the area of the rectangle ?

($\sin 40^\circ = 0.64$, $\cos 40^\circ = 0.76$)



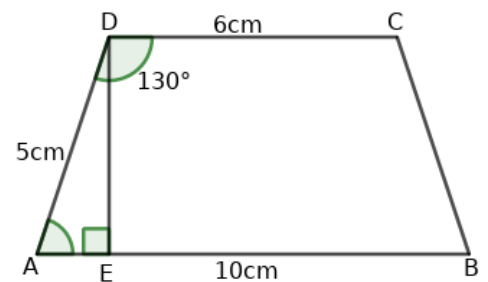
9. In the figure, $AP = 10\text{cm}$, $\angle B = 45^\circ$, $\angle C = 30^\circ$. Then ,

- Find the length of BP ?
- Find the length of PC ?
- Find the length of BC ?
- Find the area of triangle ABC ?



10. $ABCD$ is an isosceles trapezium in which parallel sides are 10cm and 6cm . Non-parallel side is 5cm . $\angle D = 130^\circ$.Then,

- Write the measure of $\angle A$?
 - Find the distance between the parallel sides?
 - Find the area of the trapezium $ABCD$?
 - Find the perimeter of the trapezium $ABCD$?
- ($\sin 50^\circ = 0.77$, $\cos 50^\circ = 0.64$, $\tan 50^\circ = 1.19$)



11. In triangle ABC , $BC = 8\text{cm}$, $\angle A = 53^\circ$, $\angle B = 67^\circ$.

- What is the measure of $\angle C$?
- Find the circumdiameter of the triangle ?
- Find the length of AB ?
- Find the length of AC ?

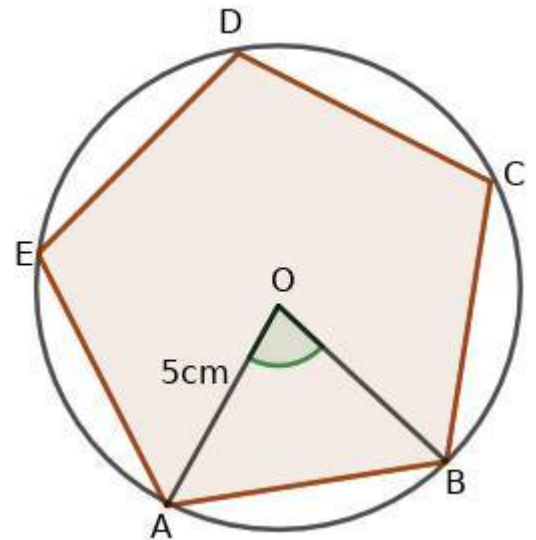
($\sin 53^\circ = 0.8$, $\sin 67^\circ = 0.9$, $\sin 60^\circ = 0.87$)

5 mark questions

1. In the figure , ABCDE is a regularpentagon . Its circumradius is 5cm.

- Find the measure of $\angle AOB$?
- Find the measure of $\angle OAB$?
- Find the length of AB?
- Find the perimeter of regular pentagon ABCDE?

Angle	sin	cos	tan
54°	0.81	0.59	1.38
36°	0.59	0.81	0.72



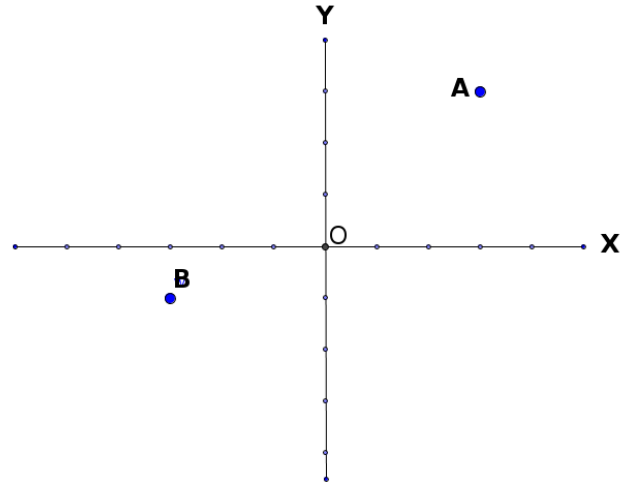
2. In triangle PQR , $\angle P = 45^\circ$, $\angle Q = 55^\circ$, $AB = 9.8\text{cm}$..Then,

- $\angle C = \text{---}$
- Find the circumdiameter?
- Find the length of AC ?
- Find the length of BC?
- Find the area of triangle ABC?

Angle	sin	cos	tan
45°	0.7	0.7	1
55°	0.82	0.57	1.4
80°	0.98	0.17	5.67

Chapter 6 Coordinates

1. Find the coordinates of the points A and B marked in the figure?



2. Draw the coordinate axes and mark the points $A(3,1)$, $B(-1,2)$, $(2,-3)$, $(-4,-1)$

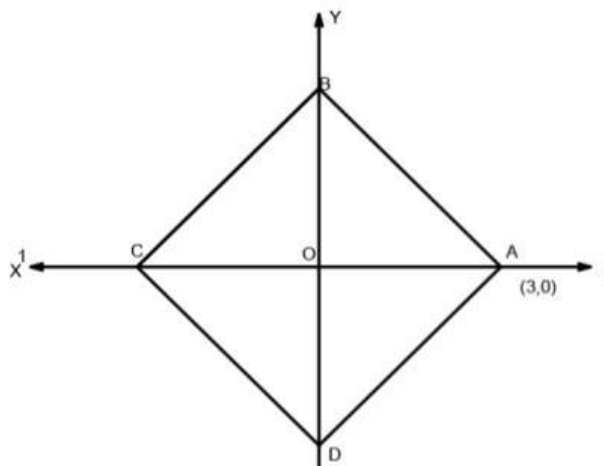
3. Draw the coordinate axes and mark the point $A(6,0)$. Draw an isosceles triangle with one of its vertices as A?

4. A circle drawn with the centre at the origin passes through the point $(4,4)$.

a) Find the radius of the circle?

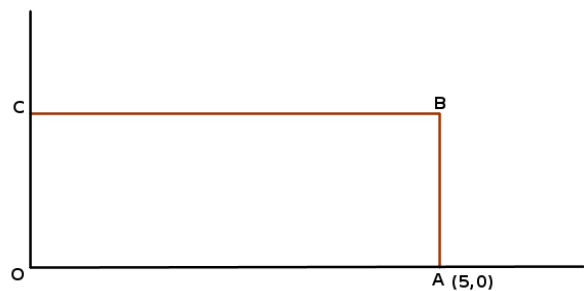
b) Find the coordinates of the point where the circle intersects the X axis?

5. In figure ABCD is a square. If the coordinates of A is $(3,0)$. Find the coordinates of the vertices B, C, D?

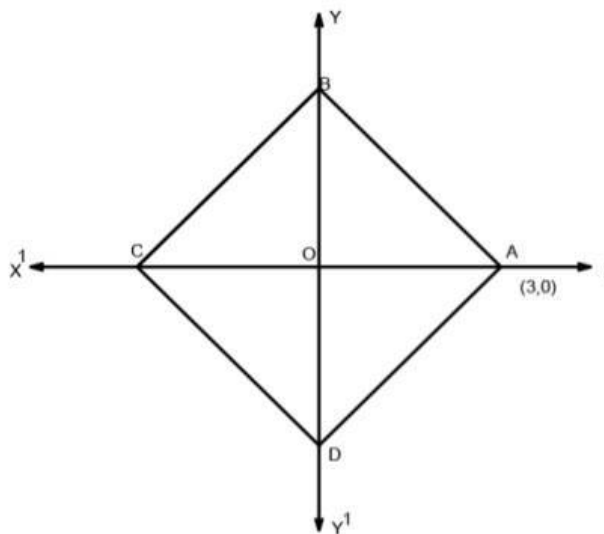


6. The sides of a rectangle are parallel to the axes. If the coordinates of a pair of opposite vertices of this rectangle are $(-1, 5)$ and $(5, 1)$ find the coordinates of other vertices ?

7. In figure OABC is a rectangle. If the breadth of the rectangle is 4 unit. Find the coordinates of B and C ?

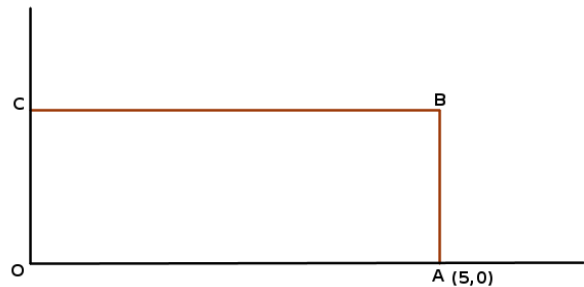


8. If radius of a circle with origin as the centre is 10 unit. Whether the point 5. In figure ABCD is a square. If the coordinates of A is $(3, 0)$. Find the coordinates the vertices B, C, D ?



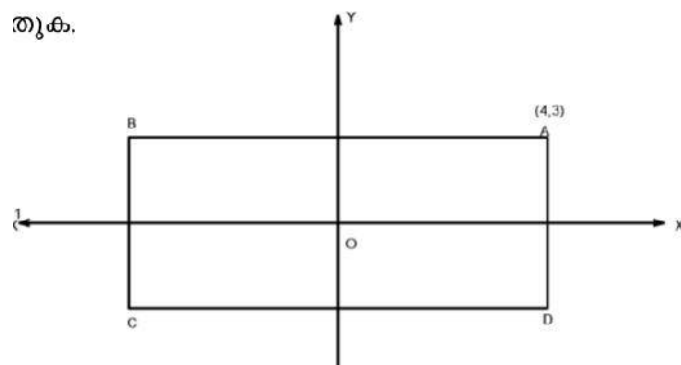
6. The sides of a rectangle are parallel to the axes. If the coordinates of a pair of opposite vertices of this rectangle are $(-1, 5)$ and $(5, 1)$ find the coordinates of other vertices ?

7. In figure OABC is a rectangle. If the breadth of the rectangle is 4 unit. Find the coordinates of B and C ?



8. If radius of a circle with origin as the centre is 10 unit. Whether the points $(5, 6)$, $(7, 8)$ are inside or outside ?

9. In figure ABCD is a rectangle. If the coordinates of A is $(4, 3)$ find the coordinates of the vertices B, C and D ?



10. $(4, 3)$ is a point on circle with origin as the centre.

- Find the radius of the circle ?
- Are the points $(0, 5)$, $(5, 5)$ on this circle ? Why?

11. a) Write the coordinates of the point which is 5 unit right to the Y axis and 3 unit below to the X axis ?

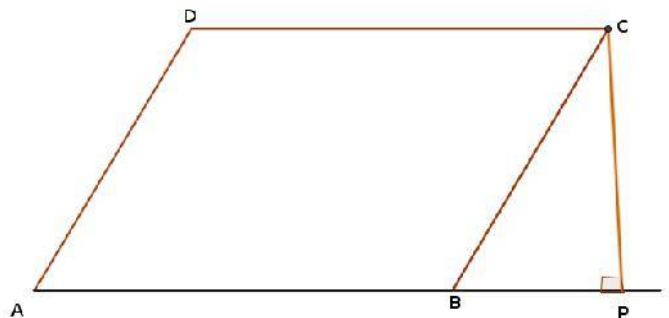
b) Write the coordinates of the point represented by the number 7 on Y axis ?

12. P(1,-3),Q(1,3) are the end points of the diameter of a circle.
 a) Find the coordinates of the centre ?
 b) Find the radius of the circle ?

PART B

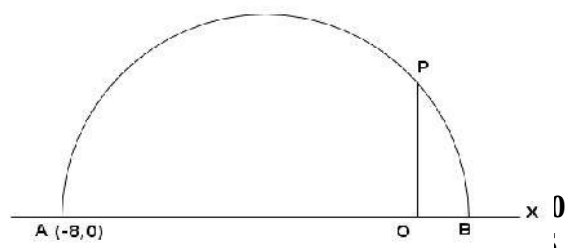
Each question carries 3 marks.

1. The points A(3,k),B(k,3) are equidistant from the point P(0,2).
 a) Find the length of PA ?
 b) Find the length of PB ?
 c) If PA=PB find the value of K ?
2. Consider the points given below . Write which of them lie on the X axis and which are on the Y axis?
 (3,0),(0,2),(-2,0),(-2,3),(3,1),(0,7),(-1,0),(2,-3),(0,4),(1,1)
3. In figure ABCD is a parallelogram. $\angle P = 90^\circ$ and A(3,5) , B(8,5) are the two vertices of the parallelogram. Also BP = 3 unit , CP=4 unit
 a) Find the coordinates of C ?
 b) Find the coordinates of D ?



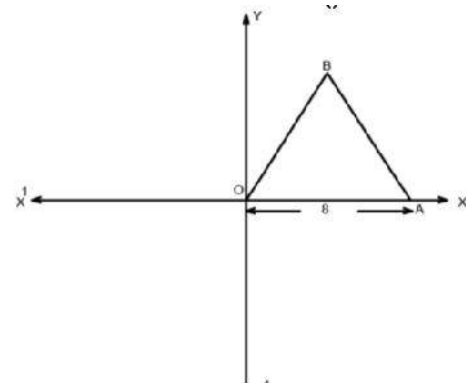
4. Prove that the points (2,5),(3,7),(5,11) are on a line ?

5. In figure the circle with diameter AB passes through the point P.
 If A(-8,0) and OP= 4 find the coordinates B ?



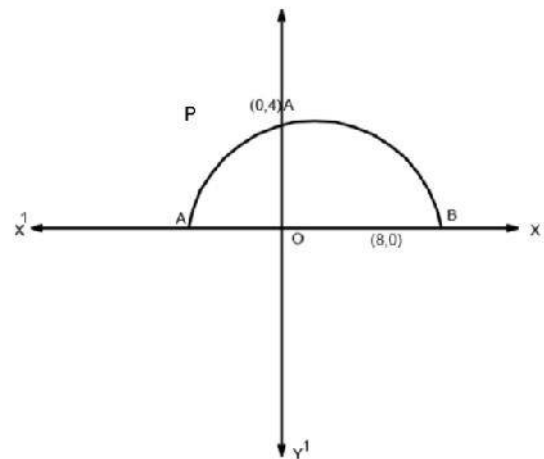
6. Prove that $A(2,1)$, $B(8,1)$, $C(5,8)$ are the vertices of an isosceles triangle ?

7. In figure OAB is an equilateral triangle. If $OA=8$ unit , find the coordinates of the vertices of triangle OAB ?



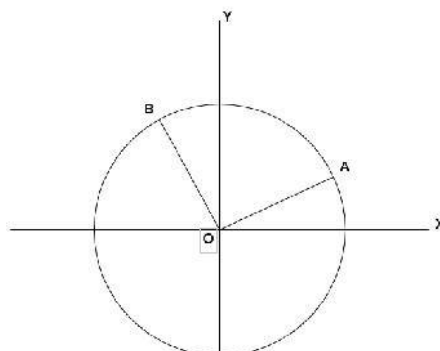
8. In figure AB is the diameter of the semi circle. If $OP \perp AB$, $B(8,0)$, $P(0,4)$

- a) Find the length of OP ?
- b) Find the coordinates of A ?



9. Prove that $(1,7)$, $(4,2)$, $(-1,-1)$, $(-4,4)$ are the coordinates of the vertices of a square ?

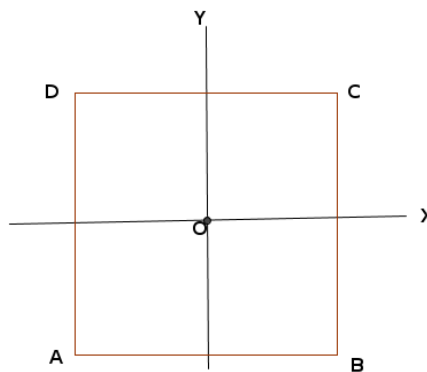
10. In figure O is the centre of the circle and A,B are the points on the circles . If $OA=6$, $\angle AOX=30^\circ$ and $\angle AOB=90^\circ$ write the coordinates of the points A and B ?



11. Write the coordinates of any six points on a circle with origin as the centre and its radius 5 units ?

12. Are the points $(2,1)(3,4)(-3,6)$ form a right angled triangle? Why ?

13. In figure the sides of a square are parallel to the axes. The midpoint of the square is the origin. If the coordinates of one of its vertices is $(4,4)$ find the coordinates of the other vertices ?

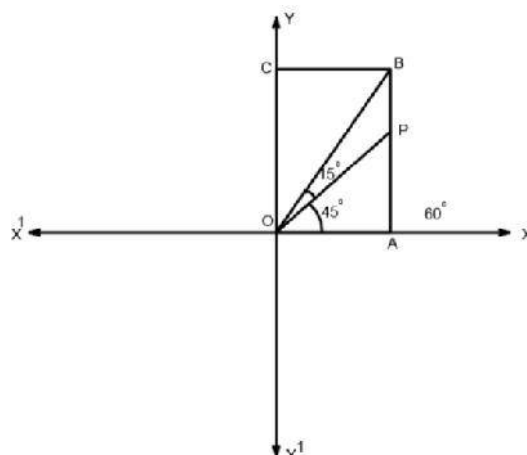


PART C

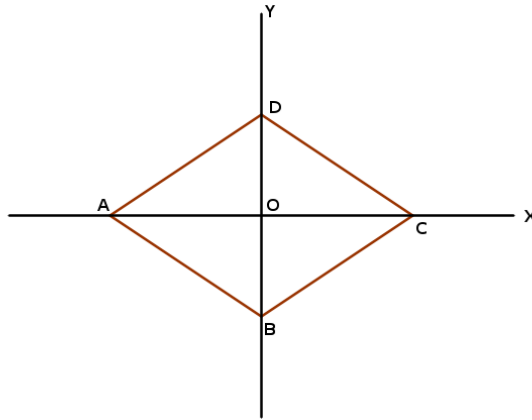
4 marks questions

1. In quadrilateral ABCD the coordinates of the vertices are $A(-4,-2)$, $B(1,-2)$, $C(2,1)$, $D(-3,2)$. Find the length of the sides ?

2. In figure OABC is a rectangle. If $\angle POA = 45^\circ$, $\angle POB = 15^\circ$ and $OA = 5$ unit find the coordinates of the vertices A, P, B, C ?



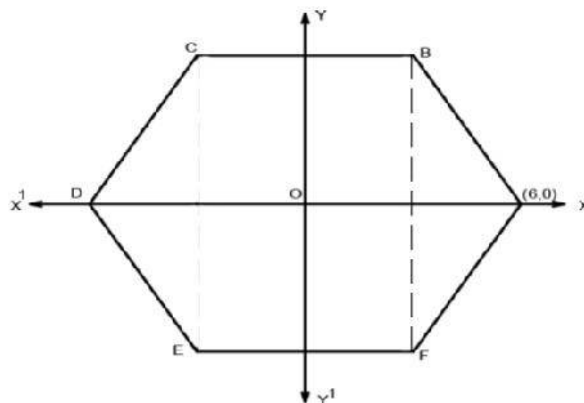
3. In figure ABCD is a rhombus. If $OC = 4$ units and $OD = 3$ units, find the coordinates of the vertices of the rhombus ABCD?



4. a) Draw the X and Y axes and mark the points $A(1,1)$ $B(7,1)$.
 b) Draw an isosceles triangle ABC with AB as its hypotenuse?
 c) Find the coordinates of C?

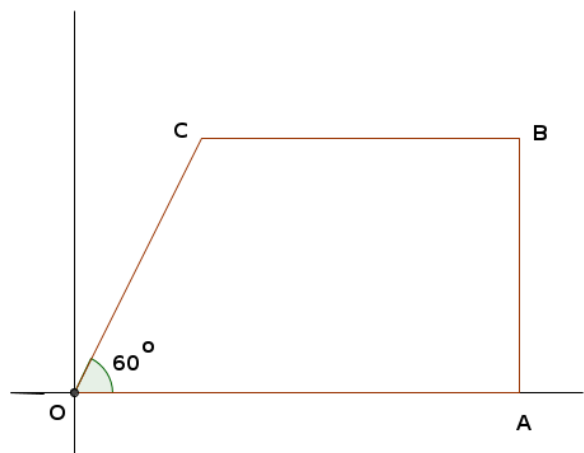
5. The vertices of triangle ABC are $A(4,4)$, $B(3,5)$, $C(-1,-1)$
 a) Find the length of sides of triangle ABC?
 b) Prove that triangle ABC is a right angled triangle?
 c) Find the area of the triangle?

6. In figure ABCDEF is a regular hexagon. The coordinates of A is $(6,0)$. Find the coordinates of the vertices B, C, D, E, F?



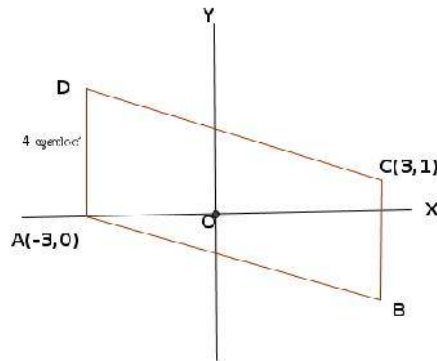
7. $(3,-1)$ is a point on the circle with centre $(6,3)$.

- a) Find the radius of the circle ?
 b) Is this circle intersect the Y axis ? Why ?
 c) Find the coordinates of the points where the circle intersect the X axis ?
8. Prove that triangle ABC is an isosceles triangle if its vertices are A(2,1)B(8,1)C(5,7) ? Find the area of the triangle ?
- 9) The sides of a rectangle are parallel to the axes . The coordinates of a pair of opposite vertices are (3,5) and (7,8).
- a) Write the coordinates of the other two vertices ?
 b) Find the length of the diagonals ?
10. The coordinates of three vertices of a rectangle are (-4,0), (0,0) and (0,2) .
- a) Draw the axes and mark these points ?
 b) Find the coordinates of its fourth vertex ?
 c) Find the length of its diagonal?
11. In figure OABC is a trapezium .If $OC = 6$, $\angle COA = 60^\circ$ and the coordinates of A is (8,0)
- a) Find the perpendicular distance from C to OA?
 b) Find the coordinates of B and C?

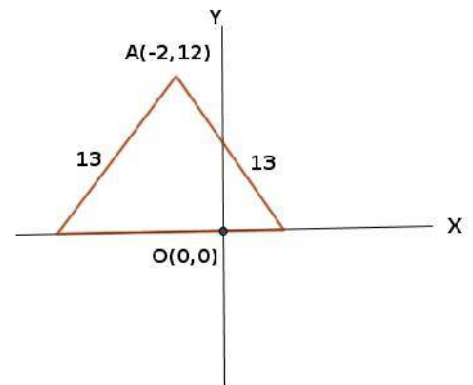


- 12 a) Draw the X and Y axes and mark the points $A(1,1)$, $B(7,1)$?
 b) Draw an isosceles right angled triangle with AB as hypotenuse?
 c) Find the coordinates of C ?

13. In figure find the coordinates of the vertices B and D ?



14. Find the coordinates of the vertices of the triangle ?

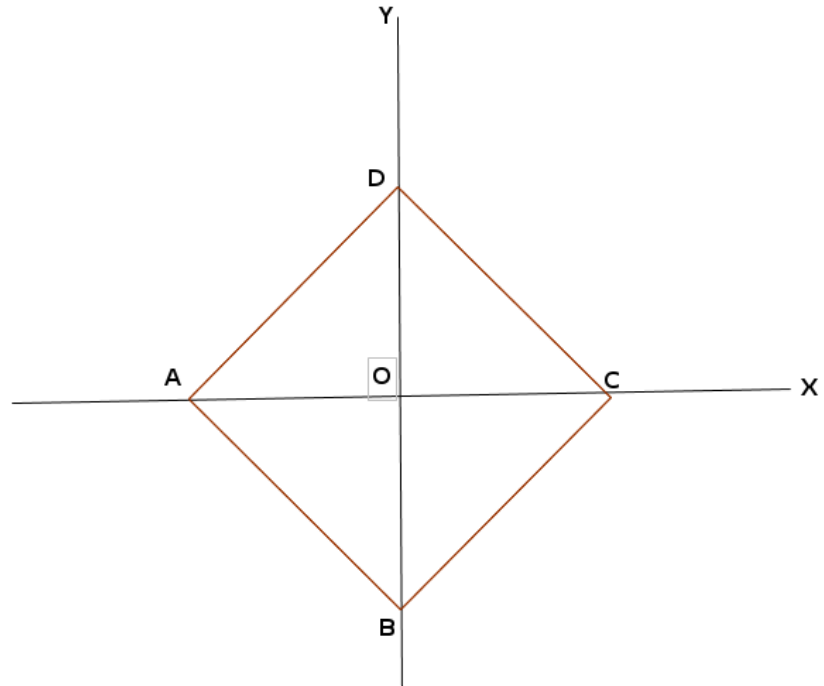


PART D

Each question carries 5 marks

- 1.a) Draw the coordinate axes and mark the points $A(3,2)$, $B(-1,-2)$, $C(1,5)$?
 b) Draw a triangle by joining these points ?
 c) Write the coordinates of any two points on a line parallel to the base of the triangle and passing through the opposite vertex .
 d) Is $(-2,5)$ a point on this line ? Why ?

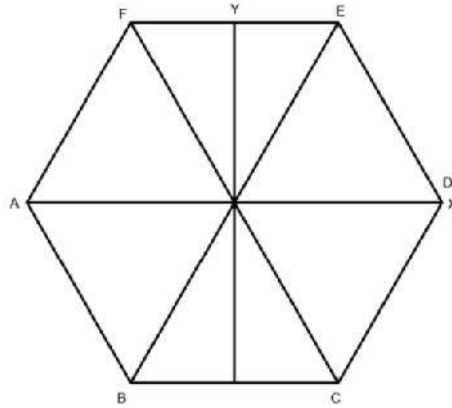
2. In figure the perimeter of square ABCD is 32 unit . Find the coordinates of its vertices ?



- 3.a) Draw a line passing through the points $(-1,3)$ and $(-1,-3)$
 b) Write two peculiarities of this line ?
 c) Find the distance between these two points ?
 d) Draw a square with these points as the vertices which lies to right to these points .

4. In figure ABCDEF is a regular hexagon. Its perimeter is 36 units.

- a) Find the coordinates of the points A, D, E ?
 b) Find the radius of the circle passing through these three points ?



4. A circle is drawn with origin as the centre and radius 10 units . Check whether the following points are inside , outside or on the circle? Why ?

a)(8,6)

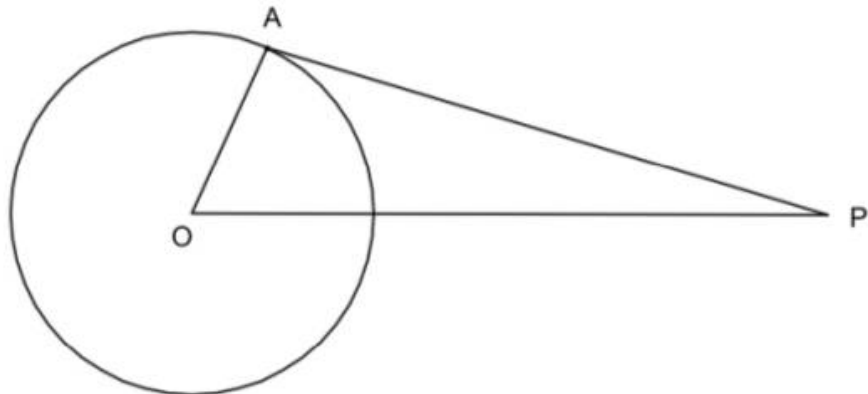
c)(-6,8)

b)(-4,9)

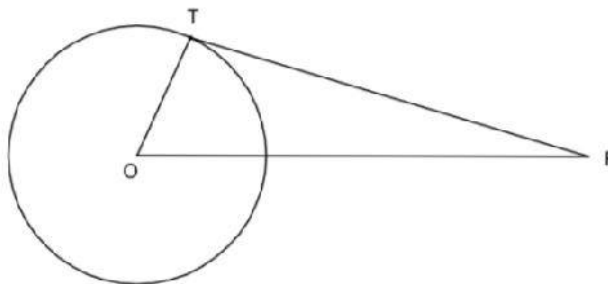
d)(-3,10)

Chapter 7 Tangents

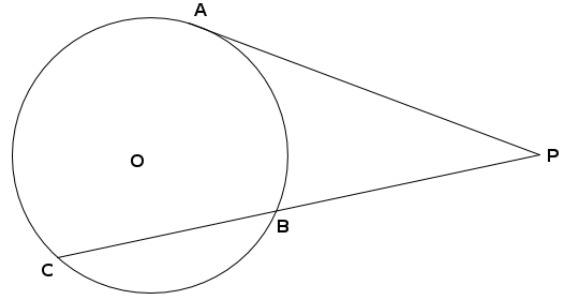
1. A tangent is drawn from a point 13 cm away from the centre of a circle with radius 5 cm . What is the length of the tangent ?
2. In figure PA is a tangent of a circle with centre at O. If $\angle AOB = 40^\circ$
 - a) Find the measure of $\angle A$?
 - b) Find the measure of $\angle P$?



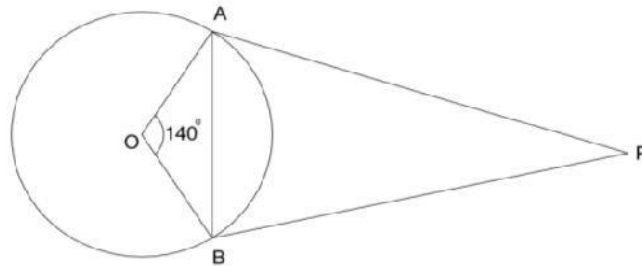
3. In figure PA is a tangent of a circle with centre at O. If $\angle P = 30^\circ$ and $OP = 8\text{cm}$
 - a) Find the measure of $\angle POT$?
 - b) Find the radius of the circle?



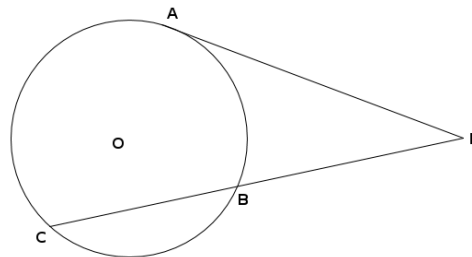
4. In figure PA is a tangent of a circle with centre at O. If $PB = 3\text{ cm}$ and $BC = 9\text{ cm}$
- Find the length of PC ?
 - Find the length of PA ?



5. In figure PA and PB are the tangents of a circle with centre at O. If $\angle AOB = 140^\circ$
- Find the measure of $\angle P$?
 - Find the measure of $\angle PAB$?

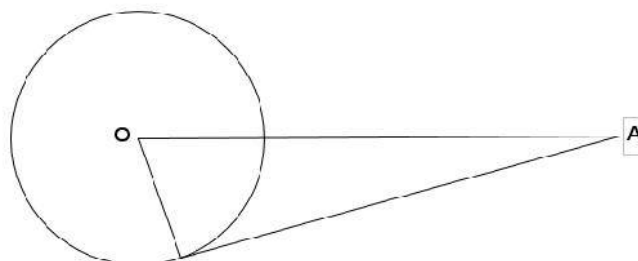


6. In figure PA is a tangent of a circle with centre at O. If $PB = 3\text{ cm}$ and $PA = 6\text{ cm}$ find the length of BC ?



7. The perimeter and area of a triangle are 42 cm and 84 cm^2 respectively. Find the radius of its incircle?

8. In figure AB is a tangent of a circle with centre at O. If $OA = 10\text{ cm}$ and $OB = 6\text{ cm}$
- Find the length of AB ?
 - What is the length of another tangent drawn from A ?



9. The hypotenuse of a right angled triangle is 15 cm and the radius of its incircle is 2 cm.

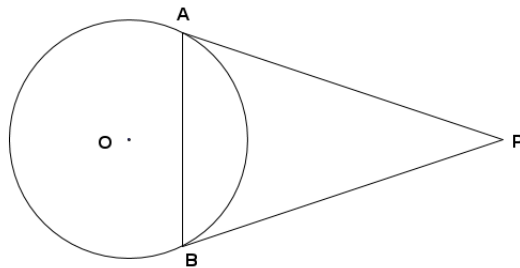
a) Find the perimeter of the triangle?

b) Find the area of the triangle?

10. In figure PA and PB are the tangent of a circle with centre at O. If $\angle PBA = 60^\circ$

a) Find the measure of $\angle PAB$?

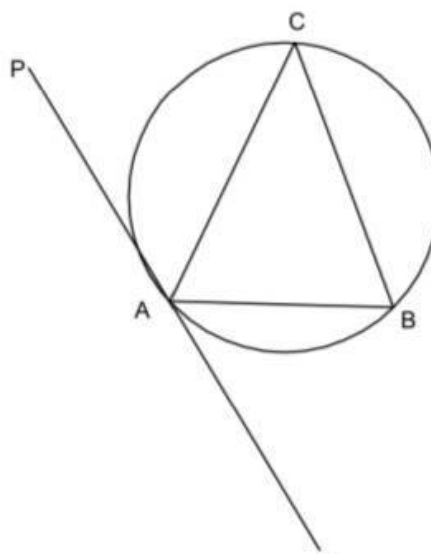
b) Find the measure of $\angle P$?



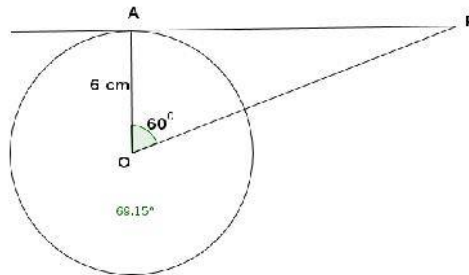
11. In figure ABC is a triangle. PQ is a tangent through A.

a) Find the measure of $\angle ACB$?

b) Find the measure of $\angle PAC$?

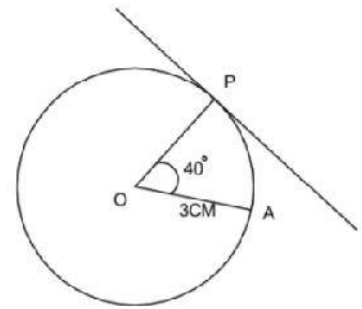


12. In figure AP is a tangent of a circle with centre at O. Radius of the circle is 6 cm. $\angle AOP = 60^\circ$. Find the length of AP, OP?

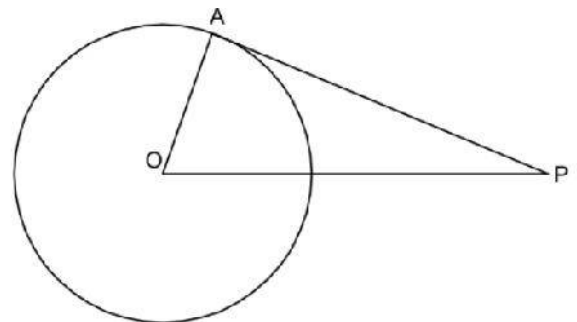


13. A point is drawn from a point which is at a distance equal to the diameter of the circle. Find the angle between the tangents drawn from this point to the circle.?

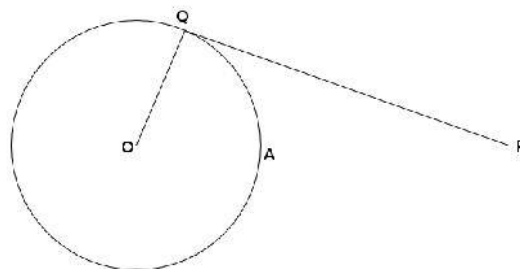
14. Draw the figure shown below with given specifications.



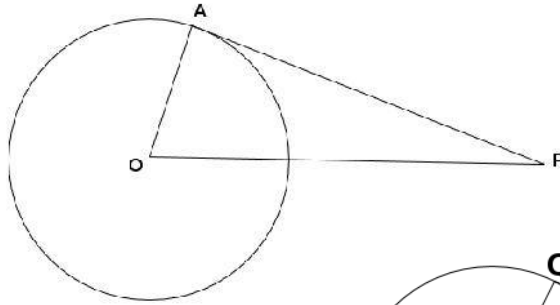
15. In figure PA is a tangent of a circle with centre at O and $OP = 2OA$
 a) Find the measure of $\angle P$?
 b) If the radius of the circle is r prove that the tangent PA is $\sqrt{3}r$?



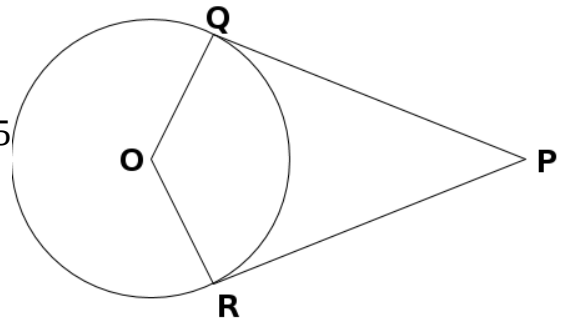
16. In figure PQ is a tangent of a circle with centre at O. If $PA = 9$ cm, $PQ = 16$ cm. Find the radius of the circle?



17. In figure PA is a tangent of a circle with centre at O . If $OP = 13\text{cm}$, $PA = 12\text{cm}$, Find the radius of the circle ?



18. In figure PQ and PR are the tangents of a circle with centre at O . The angles $\angle QOR$ and $\angle P$ are in the ratio 4:5

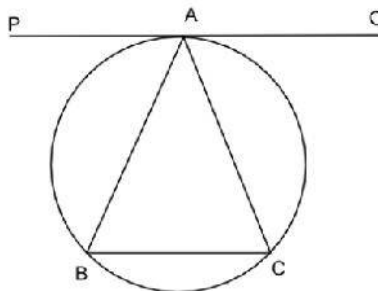


- a) Find the measure of $\angle AOB$?
- b) Find the measure of $\angle P$?

PART B

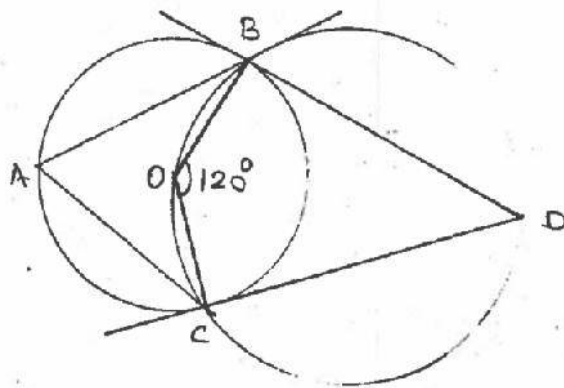
1. In figure PQ is a tangent of a circle .Also $AB = AC$

- a) Find the measure of $\angle ACB$?
- b) Find the measure of $\angle PAB$?
- c) Prove that PQ, BC are parallel ?



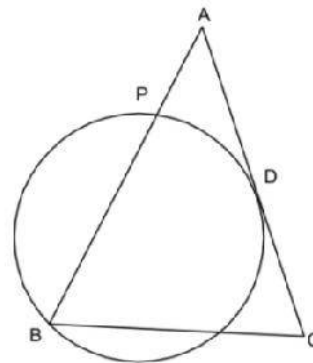
2. In figure BC and CD are the tangents of a circle with centre at O . If $\angle BOC = 120^\circ$

- a) Find the measure of $\angle D$?
- b) Find the measure of $\angle A$?
- c) If A, O, D are in a line find the measure of $\angle OBA$?



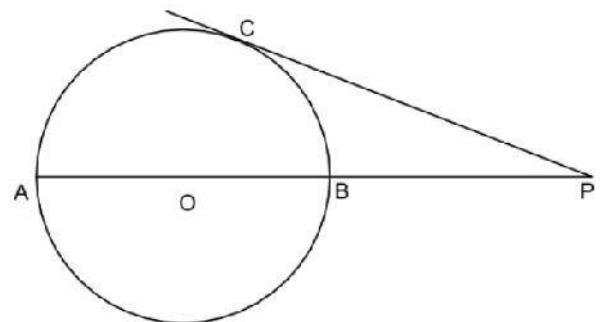
3. In figure AC is a tangent of a circle . Also D is the mid point of AC.If **AB = AC**

- a) Find $AP \times AB$?
- b) Prove that $4AP = AC$?



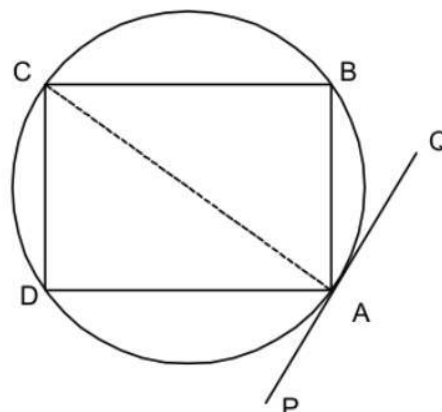
4. In figure PC is a tangent of a circle with centre at O . If **PA=8cm , PC = 4cm**

- a) Find the length of PB ?
- b) Find the radius of the circle ?

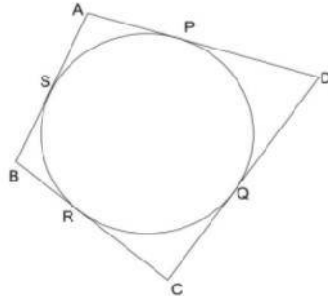


5. In figure ABCD is a square. PQ is a tangent through A.

- a) Find the measure of $\angle ACB$?
- b) Find the measure of $\angle BAQ$?



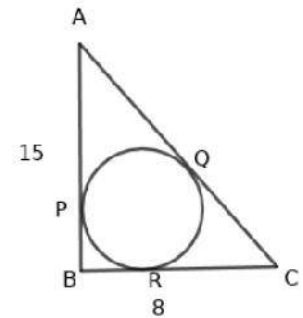
6. In figure the circle touches the sides of the quadrilateral ABCD. If $AD = 10\text{ cm}$, $BC = 6\text{ cm}$ find $AB + CD$?



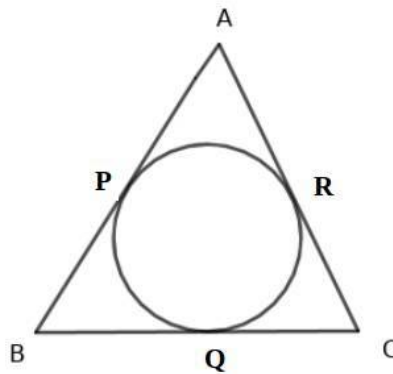
$\angle ABC = 90^\circ$, $AB = 15\text{ cm}$, $BC = 8\text{ cm}$

- Find the length of AC ?
- Find the perimeter of the triangle?
- Find the radius of the circle ?

7. I figure

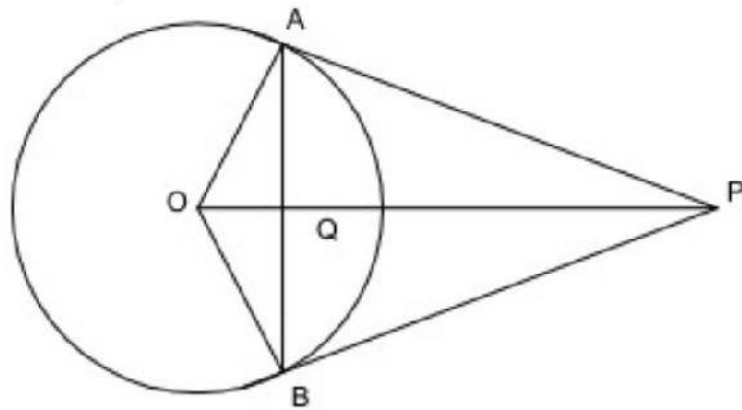


8. In triangle ABC the sides AB, BC, AC touches the circle at P, Q, R. If $AB = 12\text{ cm}$, $BC = 8\text{ cm}$, $AC = 10\text{ cm}$ find the length of AP, BQ, CR ?

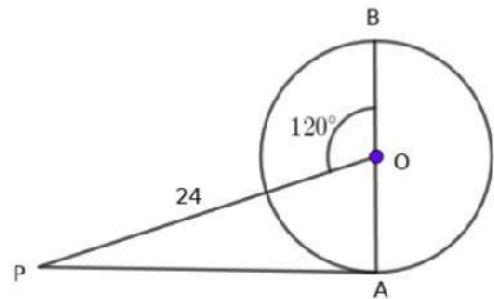


9. In figure PA and PB are tangents of the circle. If $OQ = 2\text{ cm}$, $PQ = 6\text{ cm}$,

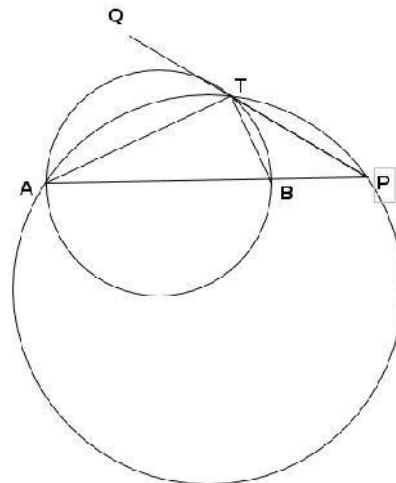
- Find the radius of the circle ?
- Find the length of AB ?



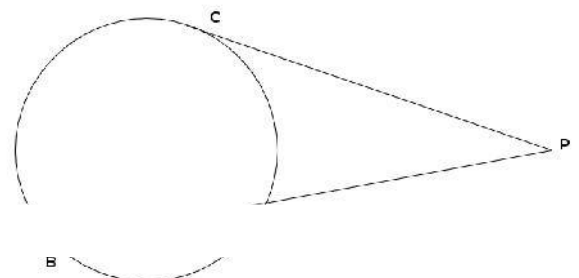
10. In figure $\angle POB = 120^\circ$. $OP = 24$ cm. AB is the diameter of the circle.
- Find the measure of $\angle P$?
 - Find the diameter of the circle?
 - Find the length of tangent from P ?



11. In figure AB is the diameter of the small circle and PQ is its tangent. If $\angle ATQ = 70^\circ$
- Find the measure of $\angle ATP$?
 - Find the measure of $\angle ABT$?
 - Find the measure of $\angle P$?



12. The sides of an equilateral triangle are of length 12.
- Find the perimeter of the triangle?
 - Find the area of the triangle??
 - Find the radius of its incircle?

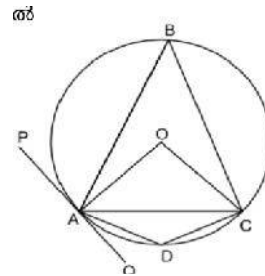


13. In figure $AP = 4\text{cm}$, $AB = 5\text{cm}$

- a) Find the length of PB ?
- b) Find the length of PC ?

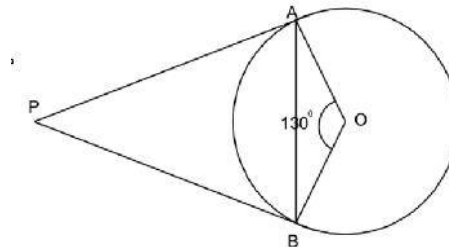
14. PQ is the tangent of a circle with centre at O if $\angle CAQ = 50^\circ$

- a) Find the measure of $\angle AOC$?
- b) Find the measure of $\angle ABC$?
- c) Find the measure of $\angle ADC$?

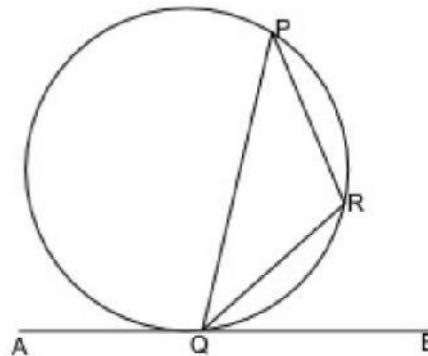


15. In figure the tangents at A and B meet at P . If $\angle AOB = 130^\circ$

- a) Find the measure of $\angle PAB$?
- b) Find the angles of $\triangle PAB$?



16. In figure AB is the tangent of the circle. If $PR = QR$ prove that QR is the bisector of $\angle PQB$?



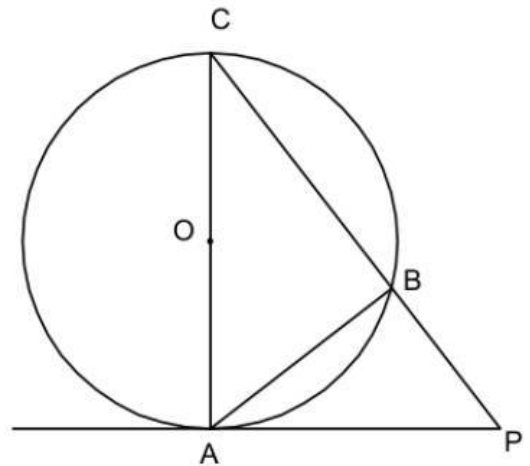
17. Draw a circle of radius 2.5 cm and mark a point 6 cm away from the center. Draw two tangents from this point to the circle.

18. In figure AB and AC are tangents and $AB = 8\text{ cm}$

- a) Find $AP \times AQ$?
- b) Find the length of AC ?

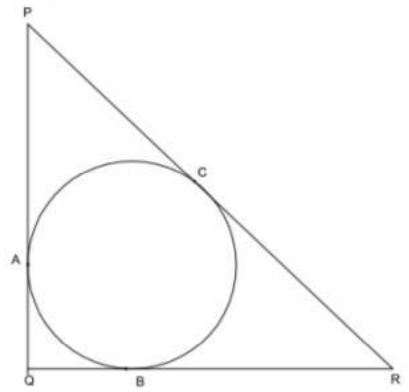
1. In figure PA is the tangent to the circle with centre at O. If $\angle PAB = 30^\circ$, $AB = 6\text{cm}$

- a) Find the measure of $\angle C$?
- b) Find the length of PA ?
- c) Find the length of PC ?



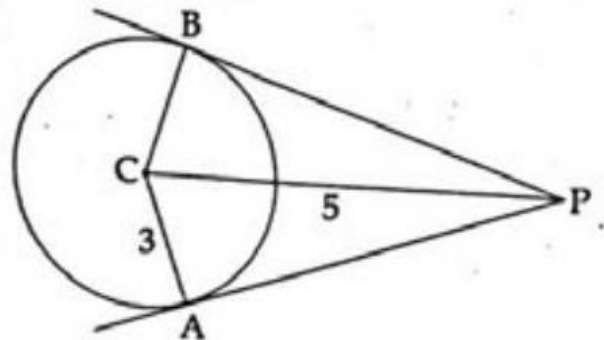
2. The sides of triangle ABC touches the circle at A,B,C. If $\angle Q = 90^\circ$, $PQ = 6\text{ cm}$, $BR = 9\text{ cm}$ and $PQ = 12\text{ cm}$

- a) Find the length of PR ?
- b) Find

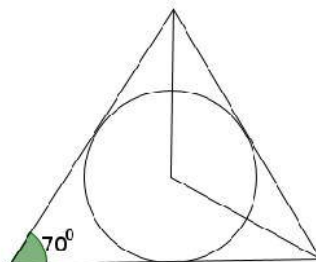


3. PA and PB are the tangents to the circle with centre C. If $PC = 5\text{cm}$, and radius of the circle is 3cm .

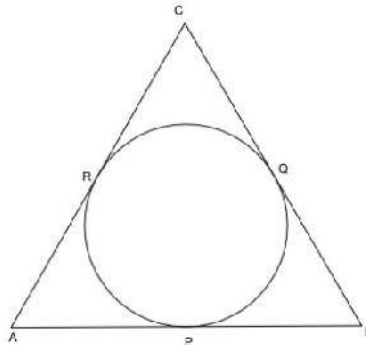
- a) Find the length of PA ?
- b) Find the area of quadrilateral PACB ?



4. In figure one angle of the triangle is 70° and two vertices of the triangle are joined to the incentre of the triangle. What is the measure of angle made at the centre ?

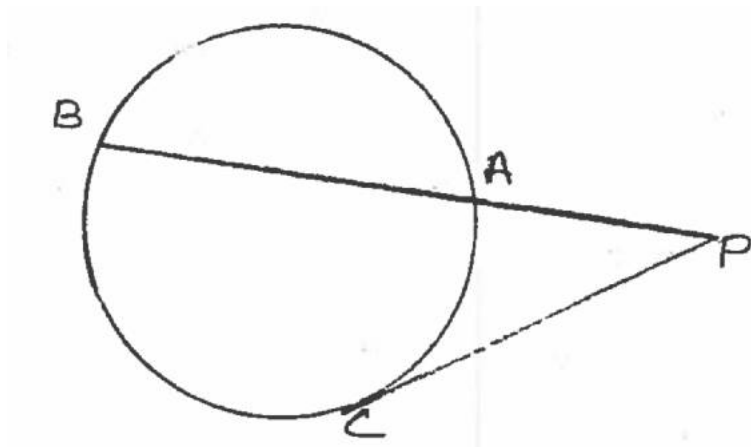


5. In figure the sides of the triangle touches the circle at P, Q and R. If $AC = BC$ prove that $AP = PB$?



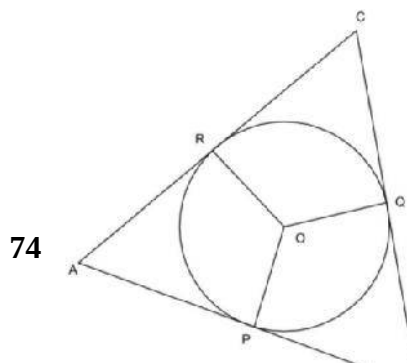
6. In figure $AB = 7\text{cm}$,
 $PC = 12\text{cm}$

- a) Take $PA = x$ write the length of PB including x ?
- b) Form a quadratic equation connecting the relation between PA , PB , PC ?
- b) Find the length of PC ?



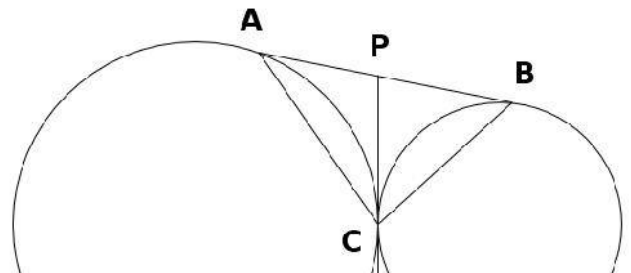
7. In figure O is the centre of the circle. The tangents through P, Q, R form the triangle ΔABC , $\angle POQ = 120^\circ$, $\angle QOR = 140^\circ$

- a) Find the measure of $\angle POR$?
- b) Find the measure of angles of ΔABC ?



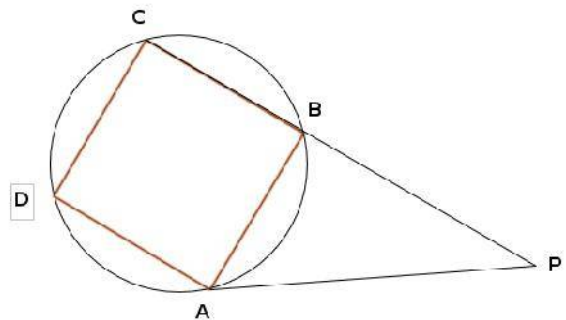
8. In figure AB and PC are the tangents common to the circle .If $PA = 4\text{cm}$, $\angle PAC = 60^\circ$

- Find the length of PB ?
- Prove that the points A,B,C are the points on a circle?
- Find the measure of $\angle ACB$?
- Find the length of BC ?



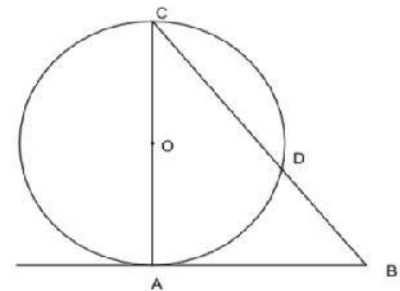
9. ABCD is a square. PA is the tangent to the circle.

- Find the measure of $\angle PAB$?
- Find the measure of $\angle PBA$?
- Find the measure of $\angle P$?
- If $PA = 10\text{ cm}$ find the area of the square ABCD ?



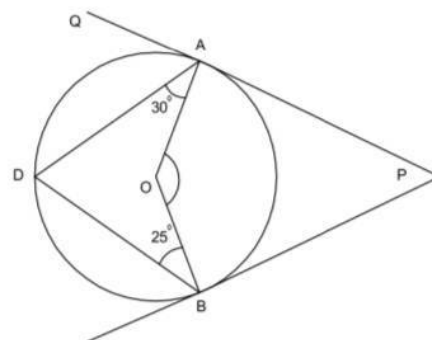
10. AB is a tangent of a circle with centre O. If $BD = 4\text{cm}$, $CD = 5\text{cm}$

- Find the length of AB ?
- Find the radius of the circle ?



11. PA and PB are the tangents to a circle with centre at O. If $\angle OAD = 35^\circ$, $\angle OBD = 25^\circ$

- Find the measure of $\angle ADB$?
- Find the measure of $\angle AOB$?
- Find the measure of $\angle P$?
- Find the measure of $\angle QAD$?



12. The perpendicular sides of a right triangle are 15 cm, 8 cm.

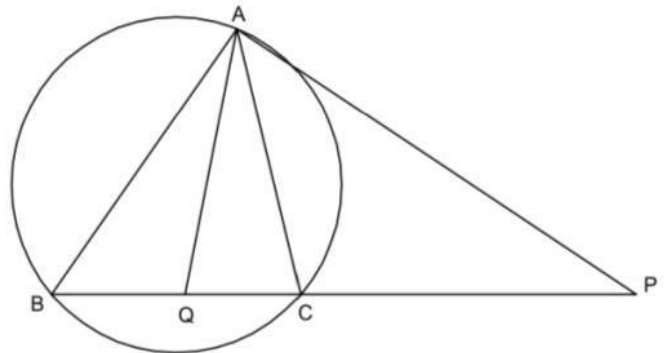
- Find the length of its hypotenuse?
- Find the perimeter of triangle?
- Find the area of triangle?
- Find the radius of the incircle?

13. Construct a triangle of sides 6cm, 6.5cm, 7cm. Draw its incircle.

14. Draw a circle of radius 2.5 cm? Draw an equilateral triangle with its sides touching the circle.

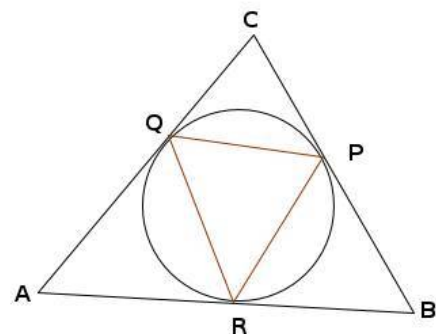
15. In figure PA is the tangent of the circle. AQ is the bisector of $\angle CAB$. If $\angle ABQ = 40^\circ$, $\angle BAQ = 30^\circ$

- Find the measure of $\angle PAC$?
- Find the measure of $\angle BAC$?
- Find the measure of $\angle P$?



16. In figure the circle touches the triangle $\triangle ABC$ at the points P, Q, R. $\angle A = 80^\circ$

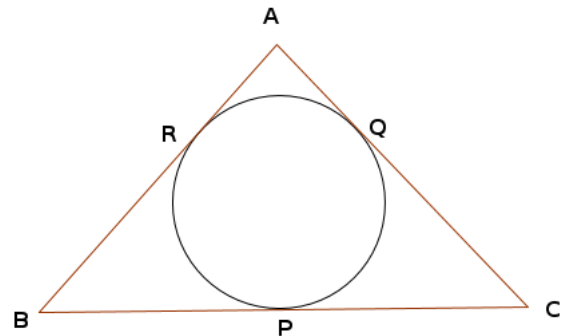
- Find the other two angles of $\triangle AQR$?
- Find the measure of $\angle P$ of $\triangle PQR$?



PART D

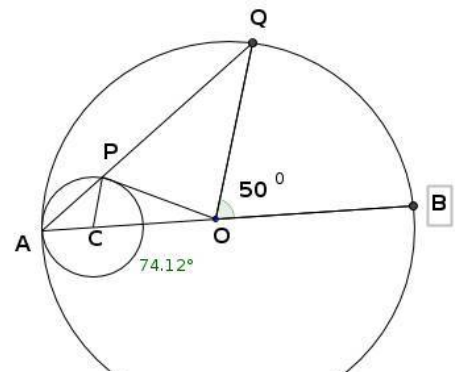
1. The circle centred at O touches the triangle at P,Q,R . If $AB = AC$, $AQ = 4$ cm , $CQ = 6$ cm

- a) Find the length of CP ?
- b) Find the perimeter of the triangle ?
- c) If radius of the circle is 4 cm what is the area of the triangle ?



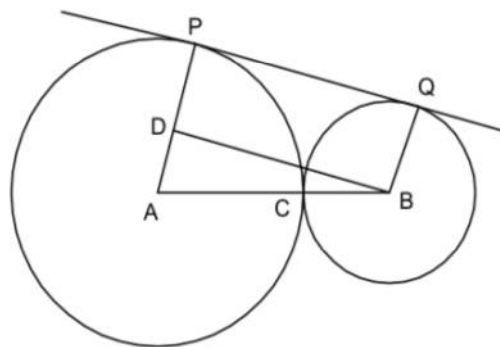
2. In figure O is the centre of the large circle and C is the centre of small circle.OP is the tangent of small circle. If $\angle BOQ = 50^\circ$ Find

- a) $\angle OAQ = \dots\dots\dots$
- b) $\angle OCP = \dots\dots\dots$
- c) $\angle APO = \dots\dots\dots$
- d) $\angle POQ = \dots\dots\dots$



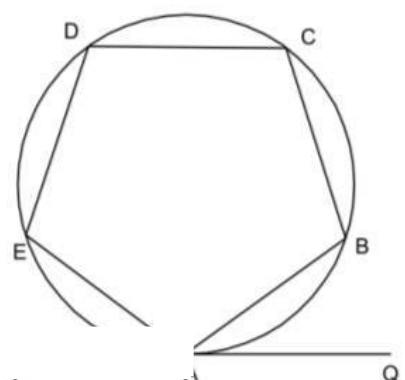
3. In figure the radius of the circle centred at A is 8 cm and radius of the circle centred at B is 8 cm. The circles touch at C. PQ is a tangent common to both the circles . $PQ \parallel BD$.

- a) Find the measure of $\angle ADB$?
- b) Find the length of AD ?
- c) Find the length of BD ?
- d) Find the length of PQ ?



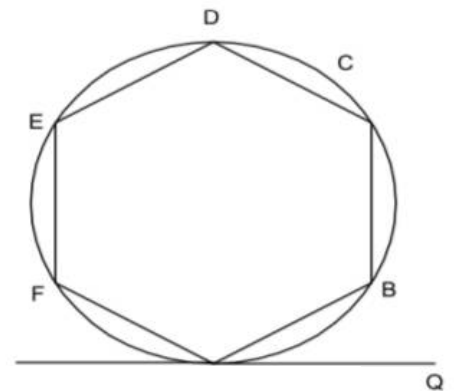
4. In figure ABCDE is a regular pentagon . PQ is a tangent through A.

- a) Find the measure of $\angle BCD$?

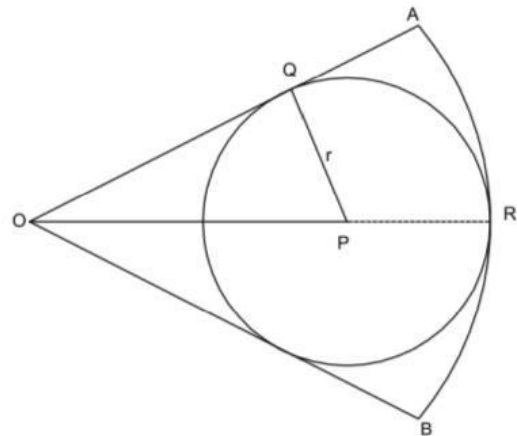


- b) Find the measure of the angle made by the chord A at C?
 c) Find the measure of $\angle BAQ$?

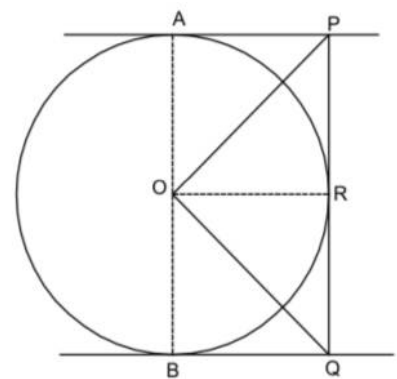
5. In figure ABCDEF is a regular hexagon. PQ is a tangent through A.
 a) Find the measure of $\angle BCD$?
 b) Find the measure of the angle made by the chord at C?
 c) Find the measure of $\angle BAQ$?



6. In figure the circle and sector touches at R. OA, OB are the tangents. If the radius of the sector is 6 cm and central angle is 60°
 a) Find the measure of $\angle POQ$?
 b) If $PQ = r$ what is the length of OP ?
 c) Find the radius of small circle ?

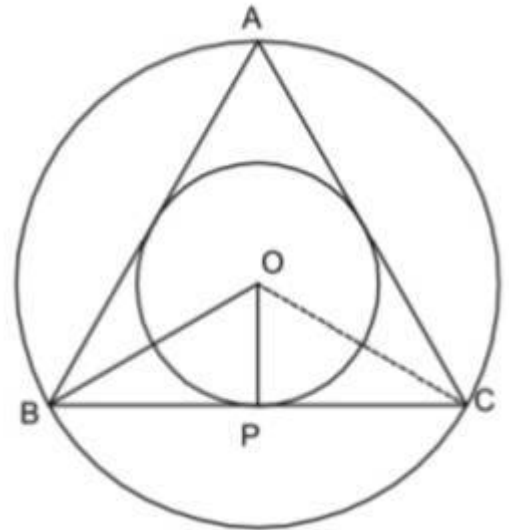


7. In figure AP, BQ, PQ are the tangents at A, B, R
 a) Prove that the angles $\angle AOP$ and $\angle OP$ are equal ?
 b) Prove that the angles $\angle BOQ$ and $\angle ROQ$ are equal ?
 c) Find the measure of $\angle POQ$?



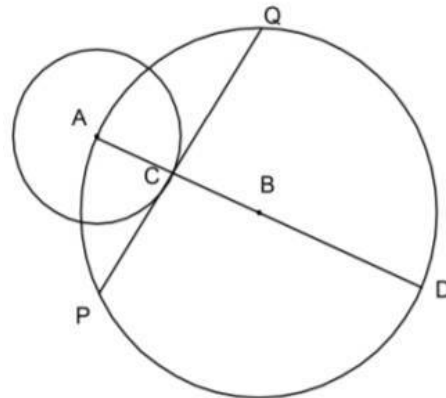
8. In figure ΔABC is an equilateral triangle. The centre of circum circle and incircle is O.

- Find the measure of $\angle A$?
- Find the measure of $\angle BOC$?
- Find the measure of angles of ΔBPO ?
- Prove that the radius of circum circle of ΔABC is twice its radius of incircle ?



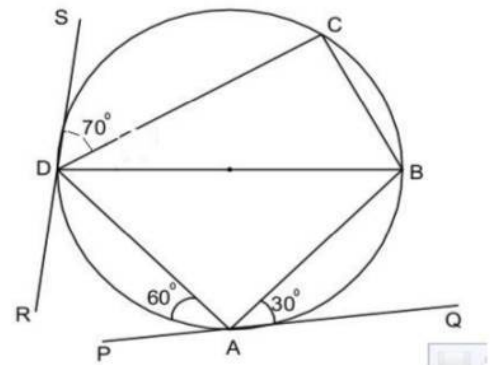
9. In figure the radius of the circles with A and B are 2 cm and 4 cm respectively. PQ is the tangent of the circle with centre A.

- Find the length of CD ?
- Find the length of PQ ?
- Find the length of AP ?
- Find the measure of $\angle PAQ$?



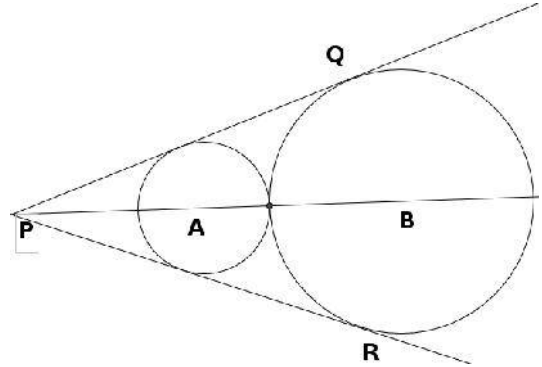
10. In figure PQ and RS are the tangents of the circle. If $\angle CDS = 70^\circ$, $\angle PAD = 60^\circ$, $\angle BAQ = 30^\circ$

- Find the measure of $\angle ADB$, $\angle ABD$, $\angle CBD$?
- Find the measure of angles of quadrilateral ABCD ?



11. Draw a triangle with two angles 60° , 70° and its inradius is 2.5 cm

12. PQ and PR are the tangents of the circles with the centre at A and B. If $\angle APQ = 30^\circ$. If radius of the small triangle is 3 cm



- Find the length of PA ?
- If the radius of large circle is write the length of PB including r ?
- Find the radius of large circle ?

CHAPTER 8

SOLIDS

Quick review:

- * A square pyramid has one base and four lateral faces.
- * A square pyramid has a square base and isosceles triangles.
- * If the length of the base of a pyramid is 'a', height 'h', slant height 'l' and base diagonal 'd'. Then

$$l^2 = (a/2)^2 + h^2 \quad (\text{hal})$$

$$e^2 = l^2 + (a/2)^2 \quad (\text{ela})$$

$$e^2 = h^2 + (d/2)^2 \quad (\text{hed})$$

- * Lateral surface area of a square pyramid = $(1/2) \times \text{base perimeter} \times \text{slant height}$.
- * Total surface area of a square pyramid = base area + lateral surface area.
- * Volume of a square pyramid = $(1/3) \times \text{base area} \times \text{height}$.
- * If in a cone the base radius is 'r', height is 'h' and slant height 'l', then

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

- * Curved surface area of a cone = $\pi r l$.

- * Total surface area of a cone = $\pi r l + \pi r^2$.
- * Volume of a cone = $(1/3)\pi r^2 h$.
- * Total surface area of a sphere = $4\pi r^2$.
- * Volume of a sphere = $(4/3)\pi r^3$.
- * Curved surface area of a hemisphere = $2\pi r^2$.
- * Total surface area of a hemisphere = $3\pi r^2$.
- * Volume of a hemisphere = $(2/3)\pi r^3$.

Part A

Each question carries 2 marks

1. The base edge of a square pyramid is 10 cm and its slant height is 13 cm.
 - a) Find its height?
 - b) Find its lateral edge?

2. The base perimeter of a square pyramid is 48 cm and its height is 8 cm.
Find:
 - a) the base edge of the pyramid.
 - b) the slant height of the pyramid.

3. The base area of a square pyramid is 64 sq. cm and its slant height is 15 cm.
 - a) Find the base edge of the pyramid?
 - b) Find the lateral surface area of the pyramid?

4. The base area of a cone is 225π sq. cm and its curved surface area is 345π sq. cm.
 - a) Find the radius of the cone?
 - b) Find the slant height of the cone?

5. Radius of a hemisphere is 5 cm.
 - a) Find the curved surface area of the hemisphere?
 - b) Find the total surface area of the hemisphere?

6. A sector having 120° is cut off from a circle of radius 12 cm and made a cone by rolling it.
 - a) Find the slant height of the cone?
 - b) Find the radius of the cone?

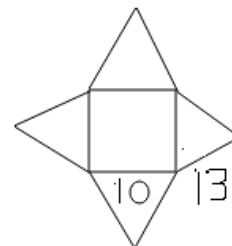
7. Surface area of a sphere is 100π sq. cm .
 - a) Find the radius of the sphere?

- b) Find the volume of the sphere?
8. Total surface area of a hemisphere is 108π sq. cm.
 a) Find the base area of the hemisphere ?
 b) Find the radius of the hemisphere?
9. Base perimeter of a cone is 10π cm and its height is 12 cm.
 a) Find the radius of the cone?
 b) Find the slant height of the cone?
10. A toy is in the shape of a sphere having radius 18 cm .Find the measure of coloured paper needed to cover the toy?
11. Ratio of the radii of two spheres is 3:4.
 a) Find the ratio of their total surface area?
 b) Find the ratio of their volumes?
12. The radius of a hemisphere and a sphere are equal.
 a) Find the ratio of their total surface area?
 b) Find the ratio of their volumes?
13. A metallic sphere having radius 12 cm is melted and recasted into 27 small spheres.
 a) Find the volume of the larger sphere?
 b) Find the radius of the smaller sphere?
14. Volume of a sphere is 972π cubic cm.
 a) Find the radius of the sphere?
 b) Find the total surface area of the sphere?

Part B

Each question carries 3 marks

1. The picture given is drawn as an opened square pyramid.



- a) What is the base edge ?
 b) What is the lateral edge ?
 c) Find the slant height?

2. The area of one lateral face of a square pyramid whose lateral faces are equilateral triangle is $16\sqrt{3}$ sq. cm.

Find:

- a) Lateral surface area.
- b) Base edge.
- c) Total surface area.

3. All edges of a square pyramid are equal. Total length of all the edges is 64 cm.

Find the:

- a) Measure of one base edge.
- b) Measure of one lateral edge.
- c) Measure of slant height.

4. Ratio of the diameters of two spheres is 3:4.

Find the:

- a) Ratio of their radii.
- b) Ratio of their total surface area.
- c) Ratio of their volumes.

5. The slant height of a square pyramid is 25 cm and its total surface area is 896 sq. cm. Find the:

- a) Length of base edge.
- b) Height of the pyramid.
- c) Volume of the pyramid.

6. The base perimeter of a square pyramid is 40 cm and slant height is 13 cm.

Find the:

- a) Measure of base edge.
- b) Lateral surface area of the pyramid.
- c) Total surface area of the pyramid.

7. A cone has diameter 12 cm and height 8 cm.

Find the:

- a) Radius of the cone .
- b) Slant height of the cone.
- c) Curved surface area.

8. The volume of a cone having 12 cm height is 100π cubic cm .

Find the:

- a) Radius of the cone.
- b) Slant height of the cone.
- c) Total surface area of the cone.

9. A sector is rolled and made into a cone of radius 5 cm and slant height 25 cm.

Find the:

- a) Radius of the sector.
- b) Central angle of the sector.
- c) Total surface area of the cone.

10. Total surface area of a sphere is 144π sq. cm.

Find the:

- a) Radius of the sphere.
- b) Volume of the sphere.
- c) If the sphere is divided into two equal hemispheres, find the total surface areas of one hemisphere?

11. A metallic cylinder has radius 12 cm and height 20 cm. Cylinder is melted and recasted into cones of radius 4 cm and height 5 cm.

Find the:

- a) Volume of the cylinder.
- b) Volume of one cone.
- c) number of cones made.

12. A largest sphere having volume 288π cubic cm is carved out from a cube.

Find the:

- a) Radius of the sphere.
- b) one side of the cube.
- c) Volume of the cube.

13. A hemisphere made of wood has radius 12 cm. A largest cone is carved out from this.

Find the:

- a) Radius of the cone.
- b) Height of the cone.
- c) Volume of the cone.

14. Height of a square pyramid is double its base edge.

- a) If the base edge is 'a', what is the height?

- b) If the volume of the pyramid is 144 cubic cm , find the height?
- c) Find the base area of the pyramid?

15. A metallic sphere having radius 12 cm is melted and recasted into a cone of base diameter 24cm.

- a) Find the volume of the sphere?
- b) If 'h' is the height of the cone,find its volume?
- c) Find the height of the cone?

16. The radius of a sphere and a cone are equal.

- a) If the volumes of two shapes are equal,find the ratio of the height of the cone and radius of the sphere?
- b) If the radius is 12 cm ,find the height of the cone?
- c) Find the volume of the cone?

Part D

Each question carries 4 marks

1. Sum of all edges of a square pyramid is 92 cm and the base perimeter is 40 cm.

Find the measures of:

- a) One base edge.
- b) One lateral edge.
- c) Slant height.
- d) Total surface area of the square pyramid.

2. A copper wire 80 cm long is bent into a shape of a square pyramid with all edges equal?

Find the:

- a) Measure of base edge.
- b) Length of lateral edge.
- c) Slant height.
- d) measure of coloured paper needed to cover the pyramid.

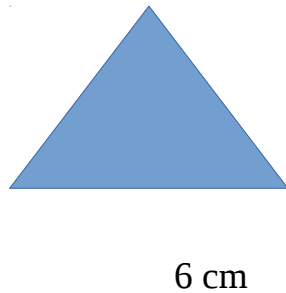
3. One edge of a cube made of wood is 12 cm. A square pyramid of maximum height is carved out from this.

Find the:

- a) Base edge of the pyramid.

- b) Height of the pyramid.
- c) Slant height of the pyramid.
- d) Total surface area of the pyramid.

4. The figure shows one lateral face of a square pyramid. All the sides of the are equal.



Find the:

- a) Total length of all the edges of the pyramid.
- b) Slant height.
- c) Height.
- d) Ratio of slant height and height.

5. A sector is cut off from a circle having radius 10 cm and a cone is made with height 8 cm by rolling the sector.

Find the:

- a) Slant height of the cone.
- b) Radius of the cone.
- c) Central angle of the sector.
- d) Curved surface area of the cone.

6. A cylindrical vessel has diameter 10 cm and height 12 cm. A cone is made with the same diameter and height. Then find:

- a) The radius of the cone.
- b) Slant height of cone.
- c) Total surface area of cone.
- d) Volume of the cone.

7. A cylinder made of wax has radius 6 cm and height 12 cm. A cone is carved out with same radius and height. Find the:

- a) Volume of cylinder.
- b) Volume of cone.
- c) Volume of the remaining wax.
- d) Number of cones that can be made with the remaining wax having radius 2 cm and height 4 cm.

8. The ratio of the radius and height of a cone is 5:12 . The volume of the cone is 800π cubic cm.

Find the:

- a) Radius of cone.
 - b) Height of cone.
 - c) Slant height.
 - d) Total surface area.
9. Volume of a cube made of wood is 216 cubic cm. A square pyramid with largest volume is carved out from the cube. Find the:
- a) Side of the cube.
 - b) Base edge of the square pyramid.
 - c) Height of the square pyramid.
 - d) Volume of the pyramid.
10. A heap of sand is in the shape of a cone. Base perimeter of the shape is 24π m and slant height is 13 m. Find the:
- a) Radius
 - b) Height.
 - c) Volume of the sand.
 - d) Cost of sand if 1 cubic m sand costs Rs 200
11. A sector with 120° central angle is cut off from a circular sheet having 15 cm radius. A cone is made by rolling the remaining sector.
- a) Write the central angle of the remaining sector.
 - b) What is the slant height of the cone.
 - c) What is the radius of the cone.
 - d) Find the total surface area of the cone.
12. A cylinder with base radius 12 cm and height 21 cm contains full of water. A metallic sphere and cone having same radius are dipped in the water. Find the:
- a) Volume of the cylinder.
 - b) Volume of the sphere.

- c) Volume of the cone.
- d) Quantity of water remained in the cylinder.

13. A cone of maximum height is carved from a sphere of radius 13 cm.

- a) Draw a rough figure?
- b) Find the radius of the cone?
- c) Find the volume of the cone?

14. A metallic cylinder with radius 8 cm and height 18 cm is melted and recasted into hemispheres having radius 3 cm. Find the :

- a) Volume of the cylinder.
- b) Volume of one hemisphere.
- c) Number of hemispheres obtained.

Part D

Each question carries 5 marks

1. A sphere is carved from a cube of side 8 cm. Find the:

- a) Radius of sphere.
- b) Total surface area of the sphere.
- c) Volume of the sphere.
- d) Height of cone carved out from the cube.
- e) Volume of the cone.

2. Volume of cone having base diameter 48 cm is 1344π cubic cm . Find the:

- a) Radius of the cone.
- b) Base area of cone.
- c) Height of the cone.
- d) Slant height of the cone.
- e) total surface area of the cone.

3. A toy is in the shape of a cone mounted on a hemisphere. Common radius of the toy is 3 cm and height of the toy is 7 cm. 500 toys are of this kind. Find the:

- a) Height of the cone.
- b) Curved surface area of hemisphere.
- c) Slant height of the cone.

- d) Curved surface area of cone.

- e) Amount needed to paint the toys if 1 sq. m painting cost Rs 5.
4. A circle having radius 10 cm is divided onto two sections in which ratio of their central angles is 2:3. Cone are made by rolling these sectors. Find the:
- Central angles of the sectors.
 - Slant height of the cones.
 - Radii of the cones.
 - Ratio of the curved surface area of the cones.
5. The height of a metallic cone is twice its diameter. Cone is melted and made spheres having half the radius. Radius of the cone 4 cm. Find the:
- Diameter of the cone.
 - Height of the cone.
 - Volume of the cone.
 - Number of spheres.
6. A circular sheet of paper having 12 cm radius is divided into 6 equal sectors. One sector is rolled and made a cone . Find the:
- Central angle of one sector.
 - Slant height of the cone.
 - Radius of the cone.
 - Curved surface area of the cone.
 - Total surface area of the cone.
7. The radius of a sphere is 10 cm . This sphere is cut into two hemispheres. Find the:
- Radius of the hemisphere.
 - Total surface area of the hemisphere.
 - Total surface area of the sphere.
 - Volume of the hemisphere.
 - Volume of the sphere.
8. A metallic sphere with radius 6 cm is melted and recasted into 3 small spheres. Radii of two spheres are 3 cm and 4 cm . Find the:
- Volume of the larger sphere.
 - Volume of sphere having radius 3 cm .
 - Volume of sphere having radius 4 cm.
 - Volume of the third smaller sphere.
 - Radius of the third sphere.
9. Sides of a rectangular prism made of wood are 10 cm,11 cm, and 12 cm.A square

pyramid with maximum volume is carved out . Find the:

- Base edge of the square pyramid.
- Height of the pyramid.
- Slant height of the pyramid.
- Total surface area of the pyramid.
- Volume of the pyramid.

10. The shape of a container is shown below.



Diameter of the hemisphere is 6 cm and height of the cone is 4 cm. The total length of the container is 22 cm. Find the:

- Height of the cylinder.
- Curved surface area of the cylinder.
- Slant height of the cone.
- Curved surface area of the cone and hemisphere.
- Total surface area of the container.

Part E

1. A triangular pyramid has 4 faces 4 vertices and 6 edges (3 base edges, 3 lateral edges) ,a square pyramid has 5 faces , 5 vertices and 8 edges (4 base edges and 4 lateral edges) and so on. Write the answers of the questions given below?

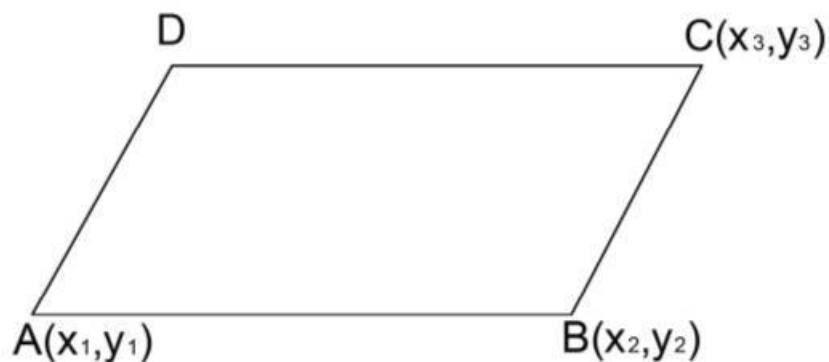
- A hexagonal prism has how many
 - Edges
 - Vertices
 - Faces
- Name a pyramid with 8 faces?
- How many faces does a pyramid have with 20 edges?
- How many verices does a pyramid have with 20 edges?

CHAPTER 9

GEOMETRY AND ALGEBRA

QUICK REVIEW

The co-ordinates of the three vertices of a parallelogram is (x_1, y_1) , (x_2, y_2) and (x_3, y_3) , then the co-ordinate of the fourth vertex is $(x_1 + x_3 - x_2, y_1 + y_3 - y_2)$



The co-ordinates of the line joining the points (x_1, y_1) and (x_2, y_2) in the ratio

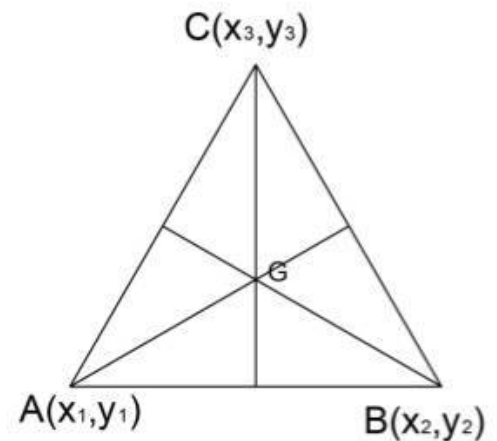
$$m:n \text{ is } P(x,y) = \frac{mx_2 + nx_1}{m+n}, \frac{my_2 + ny_1}{m+n}$$

The co-ordinate of the midpoint of the line joining the points (x_1, y_1) and (x_2, y_2)

$$\text{is } \frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}$$

The centroid of the triangle having vertices (x_1, y_1) , (x_2, y_2) and (x_3, y_3) is

$$\frac{x_1+x_2+x_3}{3}, \frac{y_1+y_2+y_3}{3}$$



The slope of a line passing through (x, y) which is not parallel to any axis is given by

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

If (x, y) be a point on the line passing through the points (x_1, y_1) and (x_2, y_2) , then equation of the line is $(y - y_1)(x - x_1) = (y_2 - y_1)(x_2 - x_1)$

Two lines which are parallel to each other have equal slopes ($m_1 = m_2$)

If two lines are perpendicular to each other, the product of the slopes is -1
($m_1 \times m_2 = -1$)

Equation of the circle with origin as centre and passing through (x, y) is $x^2 + y^2 = r^2$.

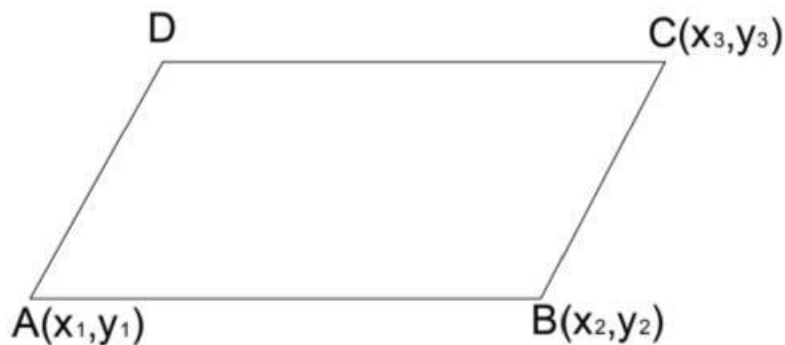
If the centre of the circle is (a, b) and radius 'r' and passing through (x, y) , then the equation of the circle is $(x - a)^2 + (y - b)^2 = r^2$

PART A

(Each question carries 2 marks)

1. A(-2,3), B(4,7) and C(7,10) are the co-ordinates of the three vertices of a

parallelogram ABCD. Find the co-ordinate of D?



2. a) Find the slope of the line passing through the points (2,5) and (3,8)?
b) What is the slope of the line parallel to the above line?
3. (2,7) and (8,15) are the co-ordinates of the ends of the diameter of a circle.
Then find the
a) co-ordinate of the centre.
b) radius of the circle.
4. The co-ordinates of two points on a line are (4,k) and (2,5). If the slope of the line is 2, find k?
5. P(2,3), Q(8,15) and R(5,9) are the three vertices of a triangle. Find the
a) co-ordinate of the midpoint of PQ.
b) centroid of the triangle.
6. Equation of a circle is $(x-3)^2 + (y-3)^2 = 25$. Find the
a) co-ordinate of the centre.
b) radius of the circle.
7. Find the ratio of the line joining the points (2,5) and (5,-9) divides the X axis.
8. a) write any one co-ordinate of a point on the line $4x-5y+8=0$.
b) Find the slope of the line?
9. P is a point which divides the line joining the points A(2,-3) and B(8,10) in the ratio 1:2. Find the co-ordinate of P?

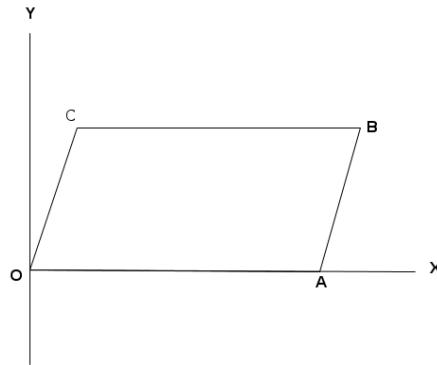
10. A(1,6) and B(4,12) are two points on a line.
a) Find the slope of the line?
b) Write the co-ordinate of another point on the line?
11. a) Write the equation of circle with centre at the origin and radius 6 cm?
b) Write the co-ordinates of any two points on the circle?
12. A(4,5), B(7,5), C(8,K) are points on a line.
a) Find the value of k?
b) line AB is parallel to which axis?

PART B

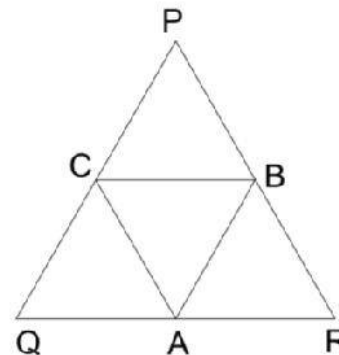
(Each question carries 3 marks)

1. a) Find the slope of the line $3x-4y+8=0$?
b) Write the equation of a line perpendicular to the above line and passes through (4,5).
2. The lines $x-2y+6=0$ and $2x+y+2=0$ intersects at the point P.
a) Find the co-ordinate of P?
b) Prove that the two lines are perpendicular.
3. a) Find the slope of the line $2x+5y=10$?
b) Find the points where the above line intersects the X axis and Y axis?
4. Co-ordinates of A,B,C are (1,-2),(3,-3) and (7,-5).
a) Find the slopes of the lines AB and BC?
b) Is it possible to draw a triangle with vertices A,B and C? Why?
5. a) Write the equation of the line passes through the point (1,3) and slope 2?
b) Check whether (3,7) is a point on this line?
6. In the figure OABC is a parallelogram. If C is (5,9) and B is (8,9). Find the

- a) Co-ordinates of A.
- b) Lengths of the sides AB and BC
- c) Find the co-ordinates of the intersecting point of the diagonal.



7. The midpoint of the line joining the points A(3,5) and B(x,-7) is P(4,y). Find
 - a) The value of x
 - b) The value of y.
 - c) Slope of the line AB?
8. The co-ordinates of the vertices A and B of triangle ABC are A(-1,5) and B(3,7). The centroid of the triangle is (1,5). Find the
 - a) Co-ordinate of C.
 - b) Slope of the line AB
9. The equation of a circle is $x^2+y^2-6x-8y+9=0$.
 - a) Find the co-ordinates of the centre of the circle?
 - b) What is the radius of the circle?
 - c) Find the co-ordinates of the point at which the circle cuts the X axis?
10. A, B, C are the midpoints of QR, PR and PQ of triangle PQR. If A(2,4), R(5,5) and B(4,7), Find the co-ordinates of P, Q, C.



PART C

(Each question carries 4 marks)

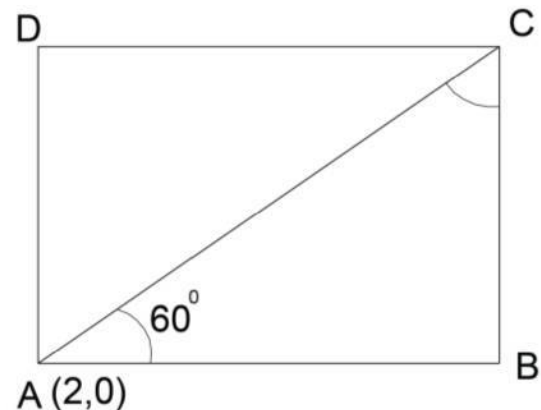
1. Slope of a line is 2 and A (1,3) is a point on the line.
 - a) Is B (3,7) , a point on this line
 - b) Write the equation of the line?
 - c) If C is a point such that $BC = 2 AB$, find the co-ordinate of C.

2. A(10,5) and B(2,-3) are points on a line.
 - a) Find the slope of AB?
 - b) Write the co-ordinates of another two points on this line?
 - c) Find the co-ordinate of the point at which the line cuts the Y axis

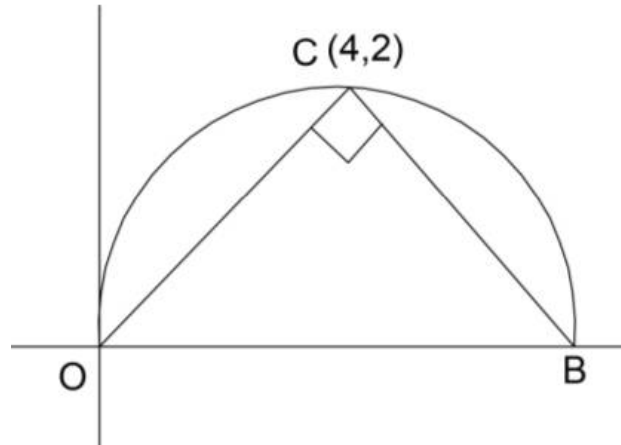
3. In parallelogram ABCD, A(-3,2), B(1,5) and C(4,9).
 - a) Find the co-ordinate of D?
 - b) Find the lengths of AB and AD?
 - c) Find the area of the parallelogram?

4. The centre of a circle is (3,2) and (7,5) is a point on the circle.
 - a) Find the radius of the circle?
 - b) Find the co-ordinate of the other end of the diameter if co-ordinate of one end is (7,5)
 - c) Write the equation of the circle?

5. Sides of a rectangle in the figure are parallel to the axis.
 Area of the rectangle is $4\sqrt{3}$ square cm. Find the
 - a) length of AB and BC
 - b) Co-ordinate of C
 - c) Slope of AC
 - d) Equation of AC



6. In the figure $\angle OCB = 90^\circ$, co-ordinate of C is (4,2).

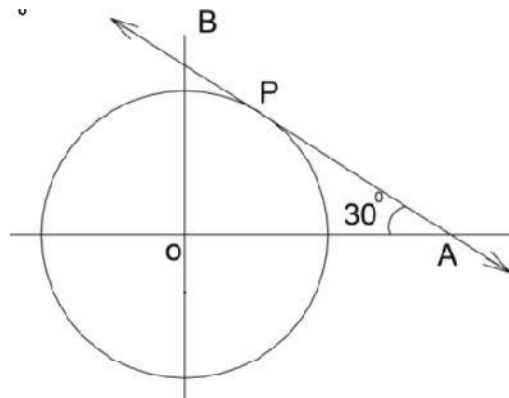


- Find the co-ordinate of B?
- Find the slope of OC and BC?
- What is special about their slopes?

7. In the figure radius of the circle with centre O is 6 units.

AB touches the circle at P and $\angle OAB = 30^\circ$.

- Find the co-ordinates of A and P?
- Write the equation of the line AB?



8. A(-2,1), C(10,10) are two points on a line. B is a point in between A and C and $AB:AC = 1:3$.

- Find the length of AB?

- Find $AB:BC$?
- Find the co-ordinate of B?
- Find the equation of line AB?

PART D

(Each question carries 5 marks)

1. In the line $5x-7y-6=0$
 - a) Check $(4,2)$ is a point on the above line.
 - b) Write another point on the line?
 - c) Write the slope of the line?
 - d) Write the equation of a line having the same slope and passing through $(3,4)$?

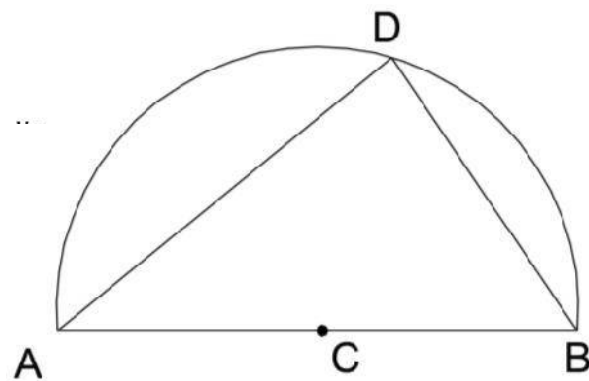
2. The equation of two lines are $3x+4y+7=0$ and $4x-3y+2=0$.
 - a) On which line the points $(1,2)$ and $(3,-4)$ lies?
 - b) If C is a common point in both the lines. Find the co-ordinate of C?
 - c) Are CA and CB perpendicular lines? Why?

3. Equation of a circle is $(x-6)^2+(y-2)^2=100$.
 - a) Find the co-ordinate of the centre of the circle?
 - b) Find the radius of the circle?
 - c) Is $(8,9)$, a point on the above circle?
 - d) Find the co-ordinate of the point where the circle cuts the Y axis?

4. In parallelogram ABCD, $A(2,5)$, $B(1,3)$ and $C(5,4)$.
 - a) Find the co-ordinate of D?
 - b) If P divides AC in the ratio 3:4, find the co-ordinates of P?
 - c) Find the slope of AB?
 - d) Find the equation of AB?

5. $A(8,6)$ is one end point of the diameter of the circle in the given figure and $C(1,7)$ is the centre of the circle. $D(2,y)$ is a point on the circle.
 - a) Find the co-ordinate of B?
 - b) Find the measure of $\angle ADB$?
 - c) What is special about the slopes of the perpendicular lines?
 - d) Find the co-ordinates of D?

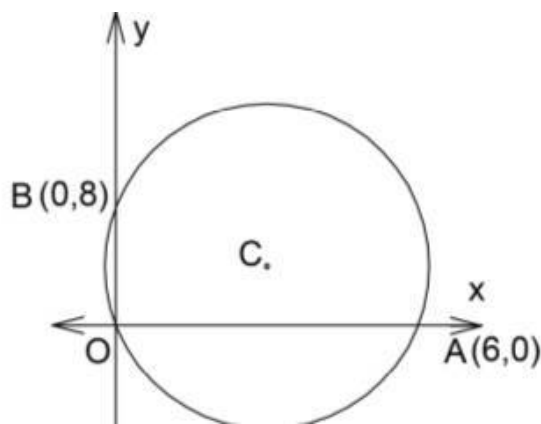
6. $A(2,5)$, $B(6,7)$, $C(7,10)$ and $D(3,8)$ are the vertices of a quadrilateral.
 - a) Find the slope of opposite sides?
 - b) Find the mid point of the diagonal?
 - c) Find the length of the diagonals?
 - d) Name of the quadrilateral ABCD



7. A(6,8), B(3,4) and C(-2,2) are the three vertices of triangle ABC. The bisector of $\angle A$ intersects BC at D.

- Find BC:CD?
- Find the co-ordinates of D?
- Write the equation of AD?

8. In the figure A(6,0), B(0,8) are the points on the x axis and y axis where the circle touches.



- Find the co-ordinate of the centre of the circle?
- Find the radius

of the circle?

- Write the equation of the circle?
- Is (7,7) a point on the circle?

9. The line joining the points (3,-1) and (13,-9) is the diameter of a circle.

Then

- Find the centre?
- Find the radius?
- Find the equation of the circle?
- Prove that no points on the circle has X co-ordinate and Y co-ordinate equal.

10. Centre of a circle is the origin and (3,4) is a point on the circle.

- Find the slope of the line joining the centre and (3,4)?
- Find the radius of the circle?
- Find the equation of the circle?
- Find the equation of the tangent passing through (3,4)?

11. The radius of the circle is 5 units and the equation of the circle is $x^2 + y^2$

$$-6x+10y+p =0.$$

- a) Find p?
- b) Find the centre of the circle?
- c) Find the co-ordinate at which the circle cuts the Y axis?
- d) Find the co-ordinate at which the circle cuts the X axis?

PART E

(6 Marks)

Read the mathematical ideas given below carefully and answer the questions .

y co-ordinates of the points on a line parallel to the X axis are equal and the x co-ordinates of the point on a line parallel to the Y axis are equal. Equation of a line parallel to X axis through the point 3 on the Y axis is 'y = 3', and the equation of a line parallel to the Y axis through the point 2 on the X axis is 'x = 2'. Equation of a line which is neither parallel to the X axis nor parallel to the Y axis is 'ax+by+c=0. Slope of this line is '-b/a'.

- a) Write the equation of the line parallel to the X axis and passing through -2?
- b) Write the equation of the line parallel to the Y axis and passing through 5?
- c) Write the slope of the line $2x+3y+4=0$?
- d) What is the slope of the line parallel to the line $2x+3y+4=0$?
- e) Is (1,-2), a point on the above line?
- f) What is the slope of a line perpendicular to the line $2x+3y+4=0$?

Chapter 10

POLYNOMIAL

PART -A

- For the following polynomials given below replace x with 0,1, - 1, 2, - 1 and find the value.
 - $x^2 - 2x + 5$
 - $x^2 - 5x + 4$
 - $x^2 - 1$
 - $2x^2 + 7x - 11$
 - $3x^3 - 7x^2 + 5x - 1$
 - $2x^3 + 3x^2 - 7x + 1$
- Consider the polynomial $P(x) = x^3 + 2x^2 + 1$
 - Find $P(1)$.
 - Find $P(0)$.
- $P(x) = 2x^2 - 3x + 1$ then,
 - What is $P(1)$?
 - Write the first degree polynomial which is a factor of $P(x)$.

4. $P(x) = 3x^3 + 4x^2 + kx - 5$ then,
 a) Find $P(-1)$
 b) If $(x + 1)$ is a factor of $P(x)$, find k .
5. $P(x) = x^2 + 6x + 8$. Write $P(x)$ as the product of two first degree polynomials.
6. Check whether $(x-3)$ is a factor of the polynomial $P(x) = 2x^3 - x^2 - 8x + 4$.
7. Consider the polynomial $P(x) = 3x^2 + 2x + 1$,
 a) Find $P(1)$.
 b) Write one of the factor of $P(x) - P(1)$.
8. In a second degree polynomial $P(x)$, $P(2) = 0$, $P(-4) = 0$. Write the factor of $P(x)$.
9. $P(x) = x^{100} - 1$ Then,
 a) Find $P(1)$.
 b) Check whether $(x+1)$ is a factor of $P(x)$ or not.
10. Write the polynomial $P(x) = x^2 - 9$ as the product of two first degree polynomial.
11. Write the second degree polynomial with $P(1) = 0$ and $P(-2) = 0$.
12. If $(x-2)$ is a factor of $P(x) = 3x^2 + kx - 6$ find the value of k ?
13. If $(x-1)$ is a factor of $P(x) = ax^3 + bx^2 + cx + d$, then what is the value of $a+b+c+d$?
14. Consider the polynomial $P(x) = x^2 + 5x + 6$.
 a) Is $(x+2)$ is a factor of $P(x)$.
 b) Is $(x+3)$ is a factor of $P(x)$.
15. Consider the polynomial $P(x) = 3x^2 + 4x - 5$.
 a) Is $(x-1)$ is a factor of $P(x)$?
 b) Which number is added to $P(x)$, to get $(x-1)$ as a factor?

PART -B

1. Consider the polynomial $P(x) = x^2 - 3x + 2$
 - a) Find $P(1)$.
 - b) Check whether $(x-1)$ is a factor of $P(x)$.
 - c) Write $P(x)$ as the product of two first degree polynomials.
2. If $P(x) = x^2 - kx + 8$
 - a) Find $P(2)$.
 - b) What is the value of k if $(x-2)$ is a factor of $P(x)$?
 - c) Write $P(x)$ as the product of two first degree polynomials if one of its factor is $(x-2)$.
3. In the second degree polynomial $P(x)$, $P(3)=0$, $P(-3)=0$.
 - a) Write two first degree factor of $P(x)$.
 - b) Write the polynomial $P(x)$.
4. Consider the polynomial $P(x) = (x-4)(x-6)$
 - a) Find $P(4)$.
 - b) Which number should be added with $P(x)$ to make a perfect square?
5. Consider the polynomial $P(x) = x^2 - 5x + 4$
 - a) Find $P(1)$.
 - b) Find $P(2)$.
 - c) Find $P(0)$.
6. Consider the polynomial $P(x) = x^2 - 5x + 10$.
 - a) Find $P(2)$.
 - b) Which number is subtracted from the polynomial $x^2 - 5x + 10$ to get $(x-2)$ as a factor?
 - c) Write $x^2 - 5x + 6$ as a multiple of two first degree polynomial.

7. Consider the polynomials $P(x) = x^2 + x + 1$.
- Find $P(1)$.
 - Check whether $P(x)$ can be written as the product of two first degree polynomials. Justify your answer.
8. If 'x' is a natural number, then
- Which number is added to $x^2 + 4x$ to get a perfect square?
 - If $x^2 + ax + 9$ is a perfect square, find the value of a ?
 - If $x^2 + ax + b$ is a perfect square prove $a^2 = 4b$.
9. Expand $(x-a)(x-b)$.
- If $x^2 - 11x + 28 = (x-a)(x-b)$, find $(a+b)$ and ab
 - Write the polynomial $x^2 - 11x + 28$ as the product of two first degree polynomial.
10. Consider the polynomial $P(x) = x^2 - 5x + 6$.
- Is $(x-2)$ is a factor of $P(x)$?
 - Is $(x+2)$ is a factor of $P(x)$? Justify.
11. The solution of the equation $x^2 + ax + b$ are -3 and 5,
- Write $x^2 + ax + b$ as a product of two first degree polynomials.
 - Find the value of a & b .
12. Find a and b , if $P(2) = 0$ and $P(3) = 0$ in the polynomial $P(x) = ax^2 + bx + c$.
13. $P(x) = x^2 + 4x + 5$. Is $P(x)$ can be written as the product of two first degree polynomials? Justify.
14. Consider the polynomial $P(x) = ax^3 + bx^2 - ax - b$,
- Is $(x-1)$ is a factor of $P(x)$?
 - Write a polynomial with $(x-1)$ as a factor.
15. If $(x+1)$ is a factor of the polynomial $ax^3 + bx^2 + cx + d$, then

a) Prove that $b+d=a+c$.

b) If $(x+2)$ is a factor of the polynomial, what is the relation between the products ?

PART -C

1. Consider the polynomial $P(x)=x^2+x-6$

a) Write the polynomial as the product of two first degree polynomials.

b) If $P(x)=0$, find the solutions.

2. In the polynomial $P(x)=x^2-5x+10$

a) Calculate $P(2)$.

b) Which number should be subtracted to $P(x)$ if $(x-2)$ is a factor.

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

3. Consider the polynomial $P(x)=3x^2-5x+7$

a) Calculate $P(2)$.

b) Write the polynomial when $P(2)$ is subtracted from $P(x)$.

c) Write $P(x)-P(2)$ as the product of two first degree polynomials.

4. a) Write $P(x)=x^2-3x+2$ as the product of two first degree polynomials.

b) Calculate the value of k when $(x-3)$ is a factor of the polynomial $P(x)=x^2-3x+2+k$.

5. a) In the polynomial $P(x)=x^2-5x+2$ find $P(2)$.

b) Write $P(x)-P(2)$ as the product of two first degree polynomials.

c) Find the solution of $P(x)-P(2)=0$.

6) In the polynomial $P(x)=ax^2+bx+c$, $P(0)=-5$ and $(x-1)$ is a factor of $P(x)$.

a) Find c .

b) Prove that $a+b=5$.

c) Write a second degree polynomial with $(x-1)$ as a factor.

7. In the polynomial $P(x) = x^2 + ax + b$, $P(3 + \sqrt{2}) = 0$ and $P(3 - \sqrt{2}) = 0$. Write the polynomial.

8. Consider the polynomial $P(x) = x^2 + bx - 6$.

a) Find $P(0)$.

b) Find the relation between a & b when $(x+2)$ is a factor of $P(x)$.

c) Find the relation between a & b when $P(1) = -3$.

9. If x is a natural number .

a) Which number is to be added to $x^2 + 10x$ to get a perfect square?

b) If $x^2 + kx + 36$ is a perfect square, what is the value of k ?

c) If $x^2 + ax + b$ is a perfect square, prove that $a^2 = 4b$.

d) Write a second degree polynomial with $(x+2)$ as a factor.

10. In the polynomial $P(x) = x^2 - 4x + 4$

a) Find $P(2)$.

b) Prove that for any number x , $P(x)$ is always non negative.

c) Find the numbers a & b such that $P(a) = P(b)$.

11. Consider the polynomial $P(x) = x^2 + 6x + k$.

a) If $k = -10$, prove that $P(x)$ can be written as the product of two first degree polynomials .

b) If $k = 10$, prove that $P(x)$ cannot be written as the product of two first degree polynomials .

c) What is the largest value of k for which $P(x)$ can be written as the product of two first degree polynomials.

12. If $(x+2)$ is a factor of the polynomial $P(x) = x^3 - ax^2 + bx + 40$.

a) Calculate $P(-2)$.

b) Calculate $P(2)$.

c) Find the value of a & b in $P(x)$.

13. Consider the polynomial $P(x) = 4x^3 + 4x^2 - kx - 1$.

- a) Find $P(1/2)$. b) Find $P(-1/2)$.
 c) Find the value of k when $P(1/2) = P(-1/2)$.

14. In a third degree polynomial $P(2) = 0$, $P(-2) = 0$ and $P(3) = 0$.

- a) Write the polynomial.
 b) Find $P(1)$. c) Find $P(-1)$.

15. Consider the polynomial $P(x) = 3x^3 - 8x^2 - 2x + 5$.

- a) Is $(x+1)$ a factor of $P(x)$.
 b) Is $(x-1)$ a factor of $P(x)$.
 c) Which number should be added to $P(x)$ when $(x^2 - 1)$ is a factor?

Chapter -11 STATISTICS

Main concepts

A single number which represents a group of measures is called their Average.

Arithmetic Mean

$$\text{Mean} = \frac{\text{sum}}{\text{number}}$$

Median

Median is the middle most item when they are arranged in the order of size

If the number of observations 'n' is odd, $\frac{n+1}{2}$ th item is the median.

If the number of observations 'n' is even, median is the middle number (mean) of $\frac{n}{2}$ th and $(\frac{n}{2} + 1)$ th observations.

Median from Frequency table

Find the half of the sum of all frequencies

Identify the class in which this half frequency belongs

Divide the above class into equal sub divisions by dividing the class by its frequency.

Assume that each frequency in this class belongs to the middle of each sub

See these middle values are in Arithmetic sequence.

Common difference of this Arithmetic sequence is the length of a sub division.

From the above, find the value corresponding to half of the total frequency

This value will be the Median of the frequency table.

Find the Mean of the following set of observations

1. 7,3,5,9,10,2,4
2. 5,9,3,7,10
3. 5,9,3,7,10,6
4. Find the average of first 13 multiples of 7.

Find the median from the frequency table

6. Given are the heights of 25 students in a class. Find their median height.

Height(cm)	Number of students

150	2
155	3
160	5
163	6
165	4
170	3
173	2

7. 35 students of a class are sorted according to their marks in an exam.

Marks	Number of students
0 – 10	8
10 - 20	7
20 - 30	10
30 - 40	6
40 - 50	4

- The mark of the student at what position is taken as the median mark ?
- Identify the median class and number of students belong to it.
- What is the assumed mark of 16 th student?
- Find the median mark.

8. See the table below

Marks	Number of students
0 – 20	3
20 - 40	5
40 - 60	10
60 - 80	6
80 - 100	3

- The mark of the student at what position is taken as the median mark ?
- Identify the median class and number of students belong to it.
- What is the assumed mark of 9 th student?
- Find the median mark.

9. See the table below

Dailywage s	Number of workers
0 – 20	3
20 - 40	5
40 - 60	10
60 - 80	6
80 - 100	3

- The wage of the worker at what position is taken as the median wage ?
- Identify the median class and number of workers belong to it.
- What is the assumed mark of 17 th student?
- Find the median wage?

10. See the table below

Marks	Number of students
0 – 10	4
10 - 20	7
20 - 30	10
30 - 40	12
40 - 50	8

- The mark of the student at what position is taken as the median mark ?
- Identify the median class and number of students belong to it.
- Find the median mark.

11. See the table below

Weight (kg)	Number of students
10 - 20	3
20 - 30	4
30 - 40	8
40 - 50	7
50 - 60	5
60 - 70	2

- The weight of the student at what position is taken as the median mark ?
- Identify the median class and number of students belong to it.

c) Find the median weight.

12. Consider there are 9 students in 30 – 40 class in the above question

Weight (kg)	Number of students
10 - 20	3
20 - 30	4
30 - 40	9
40 - 50	7
50 - 60	5
60 - 70	2

a) The weight of the students at what positions are taken for the median mark ?

b) Identify the median class and number of students belong to it.

c) Find the median weight.

13. See the table and find the median from it.

Weights of 40 students in class 10 are given below.

Weight (kg)	Number of students
20-35	7
35-40	3
40-45	8
45-50	6
50-55	9
55-60	7

- a) The weight of the students at what positions are taken for the median mark ?
- b) Identify the median class and number of students belong to it.
- c) Find the median weight.