

Assignment I

1) Find the value of $\sin^2 45^\circ + \sin^2 30^\circ + \sin^2 60^\circ$

Ans

$$\sin^2 45^\circ = \left(\frac{1}{\sqrt{2}}\right)^2, \sin^2 30^\circ = \left(\frac{1}{2}\right)^2, \sin^2 60^\circ = \left(\frac{\sqrt{3}}{2}\right)^2$$
$$= \left(\frac{1}{\sqrt{2}}\right)^2 + \left(\frac{1}{2}\right)^2 + \left(\frac{\sqrt{3}}{2}\right)^2$$

$$= \frac{1}{2} + \frac{1}{4} + \frac{3}{4}$$

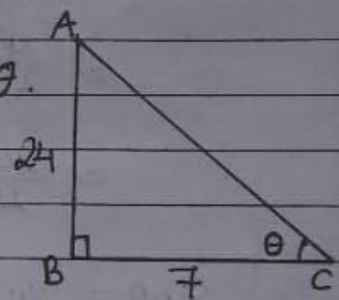
$$= \frac{2+1+3}{4}$$

$$= \frac{6}{4}$$

2) If $\tan \theta = \frac{24}{7}$, find $\sin \theta$ and $\cos \theta$.

Ans $\triangle ABC$ is a right angled triangle
let $\angle C$ be θ

$$\therefore \tan \theta = \frac{\text{opposite side of } \theta}{\text{adjacent side of } \theta} = \frac{24}{7} = \frac{AB}{BC}$$



$$\therefore AB = 24$$
$$\therefore BC = 7$$

\therefore We have to find the side AC to get the values of $\sin \theta$ and $\cos \theta$.

\therefore In $\triangle ABC$, $m\angle B = 90^\circ$,

\therefore by pythagoras theorem

$$AC^2 = BC^2 + AB^2$$

$$AC^2 = 7^2 + 24^2$$

$$AC^2 = 49 + 576$$

$$AC^2 = 625$$

$$\boxed{\therefore AC = 25}$$

\therefore Taking Square roots on both Sides.

\therefore Now we can find the values of $\sin \theta$ and $\cos \theta$

$$\sin \theta = \frac{\text{Opposite Side of } \theta}{\text{Hypotenuse}}$$

$$= \frac{AB}{AC}$$

$$= \frac{24}{25}$$

$$\boxed{\therefore \sin \theta = 24:25}$$

$$\cos \theta = \frac{\text{Adjacent Side of } \theta}{\text{Hypotenuse}}$$

$$= \frac{BC}{AC}$$

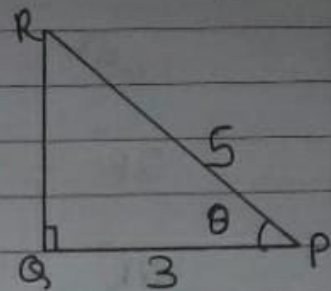
$$= \frac{7}{25}$$

$$\boxed{\therefore \cos \theta = 7:25}$$

\therefore We Successfully found the values of $\sin \theta$ and $\cos \theta$ as 24:25 and 7:25 respectively.

3) In a right angled triangle PQR, $\angle Q = 90^\circ$, $\angle P = \theta$ and $\cos \theta = \frac{3}{5}$, find $\sin \theta$ and $\tan \theta$, Similarly find $\sin^2 \theta$ and $\tan^2 \theta$

Ans Given- in $\triangle PQR$,
 $m\angle Q = 90^\circ$
 $\angle P = \theta$
 $\cos \theta = \frac{3}{5}$



To find - $\sin \theta$, $\tan \theta$, $\sin^2 \theta$, $\tan^2 \theta$

Solution-

So first-of-all lets find the values of $l(PQ)$, $l(QR)$, $l(PR)$.

$$\cos \theta = \frac{\text{Adjacent side of } \theta}{\text{Hypotenuse}} = \frac{QP}{RP} = \frac{3}{5}$$

$$\therefore l(QP) = 3$$

$$\therefore l(RP) = 5$$

Now lets find $l(RQ)$

\therefore in $\triangle PQR$, $m\angle Q = 90^\circ$

\therefore by pythagoras theorem

$$PR^2 = RQ^2 + QP^2$$

$$5^2 = 3^2 + QR^2$$

$$25 = 9 + QR^2$$

$$QR^2 = 25 - 9$$

$$QR^2 = 16$$

$$\boxed{QR = 4} \quad \text{Taking Square roots on both sides.}$$

Now let us find the values of $\sin \theta$, $\cos \theta$, $\sin^2 \theta$, $\tan^2 \theta$

$$\sin \theta = \frac{\text{opposite side of } \theta}{\text{Hypotenuse}}$$

$$= \frac{RQ}{RP}$$

$$= \frac{4}{5}$$

$$\boxed{\therefore \sin \theta = 4:5}$$

$$\tan \theta = \frac{\text{opposite side of } \theta}{\text{Adjacent side of } \theta}$$

$$= \frac{RQ}{QP}$$

$$= \frac{4}{3}$$

$$\boxed{\therefore \tan \theta = 4:3}$$

SDS Page No. _____
Date: _____

$$\sin^2 \theta = \left(\frac{\text{opposite side of } \theta}{\text{Hypotenuse}} \right)^2$$

$$= \left(\frac{RQ}{RP} \right)^2$$

$$= \left(\frac{4}{5} \right)^2$$

$$= \frac{16}{25}$$

$$\therefore \sin^2 \theta = 16:25$$

$$\tan^2 \theta = \left(\frac{\text{opposite side of } \theta}{\text{Adjacent side of } \theta} \right)^2$$

$$= \left(\frac{RQ}{QP} \right)^2$$

$$= \left(\frac{4}{3} \right)^2$$

$$= \frac{16}{9}$$

$$\therefore \tan^2 \theta = 16:9$$

\therefore We successfully found the values of the following as following.

$$\sin \theta = 4:5$$

$$\tan \theta = 4:3$$

$$\sin^2 \theta = 16:25$$

$$\tan^2 \theta = 16:9$$

4) find the value of $\frac{\cos 56^\circ}{\sin 34^\circ}$

Ans

We know that, $\cos \theta = \sin (90 - \theta)$ So using this property.

$$\cos 56^\circ = \sin (90 - 56)$$

$$\cos 56^\circ = \sin 34^\circ \quad \dots \textcircled{I}$$

$$\therefore \frac{\cos 56^\circ}{\sin 34^\circ}$$

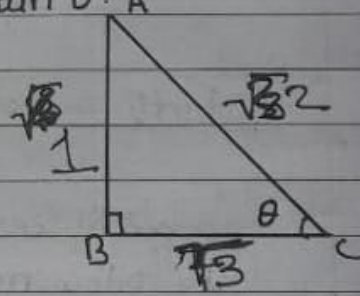
$$= \frac{\sin 34^\circ}{\sin 34^\circ} \quad \text{from I}$$

$$= 1$$

$$\therefore \frac{\cos 56^\circ}{\sin 34^\circ} = 1$$

5) If $\cos \theta = \frac{\sqrt{3}}{2}$, find $\sin \theta$ and $\tan \theta$.

Ans ΔABC is a right angled triangle and let $\angle C$ be θ



$$\cos \theta = \frac{\text{Adjacent Side of } \theta}{\text{Hypotenuse}} = \frac{BC}{AC} = \frac{\sqrt{3}}{2}$$

$$\therefore BC = \sqrt{3}$$

$$\therefore AC = 2$$

Now let us find $\angle B$

$$\therefore \text{in } \Delta ABC, \angle B = 90^\circ$$

\therefore by Pythagoras Theorem.

$$AC^2 = BC^2 + AB^2$$

$$4^2 = (\sqrt{3})^2 + AB^2$$

$$4 = 3 + AB^2$$

$$4 - 3 = AB^2$$

$$AB^2 = 1$$

$$\boxed{AB = 1} \quad \because \text{Taking Square root on both the sides}$$

$$\sin \theta = \frac{\text{Opposite side of } \theta}{\text{Hypotenuse}}$$

$$= \frac{AB}{AC}$$

$$= \frac{1}{2}$$

$$\boxed{\therefore \sin \theta = 1:2}$$

$$\tan \theta = \frac{\text{Opposite side of } \theta}{\text{Adjacent side of } \theta}$$

$$= \frac{AB}{BC}$$

$$= \frac{1}{\sqrt{3}}$$

$$\boxed{\therefore \tan \theta = 1:\sqrt{3}}$$

\therefore We Successfully found the value of $\sin \theta$ and $\cos \theta$ as $1:2$ and $1:\sqrt{3}$

Adjustment details

Q.2, Q.4 and Q.5 are
Solved first and

Q.1 and Q.3 (Graphs)
Are solved at the end
of Assignment 2

Assignment 2

Q.2

Complete the following table in order to get the graph of equation $2x + y = 5$

x	0	2.5	2
y	5	0	1
(x, y)	(0, 5)	(2.5, 0)	(2, 1)

Q.4

Match the following

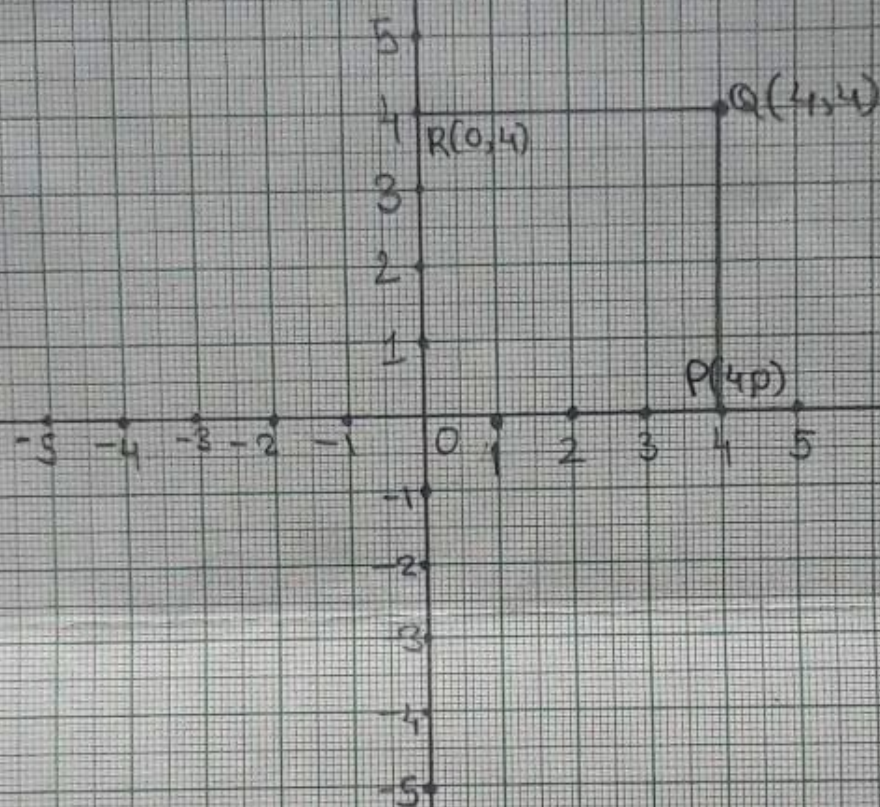
- 1] Both x coordinates are positive - First Quadrant
- 2] Both Coordinates are negative - Third Quadrant
- 3] x -Coordinate is 0 and y -Coordinate is positive - ~~Fourth Quadrant~~
y-axis
- 4] x -Coordinate is positive and y -Coordinate is negative - Fourth Quadrant

Q.5

1] Equation of x -axis is $y = 0$

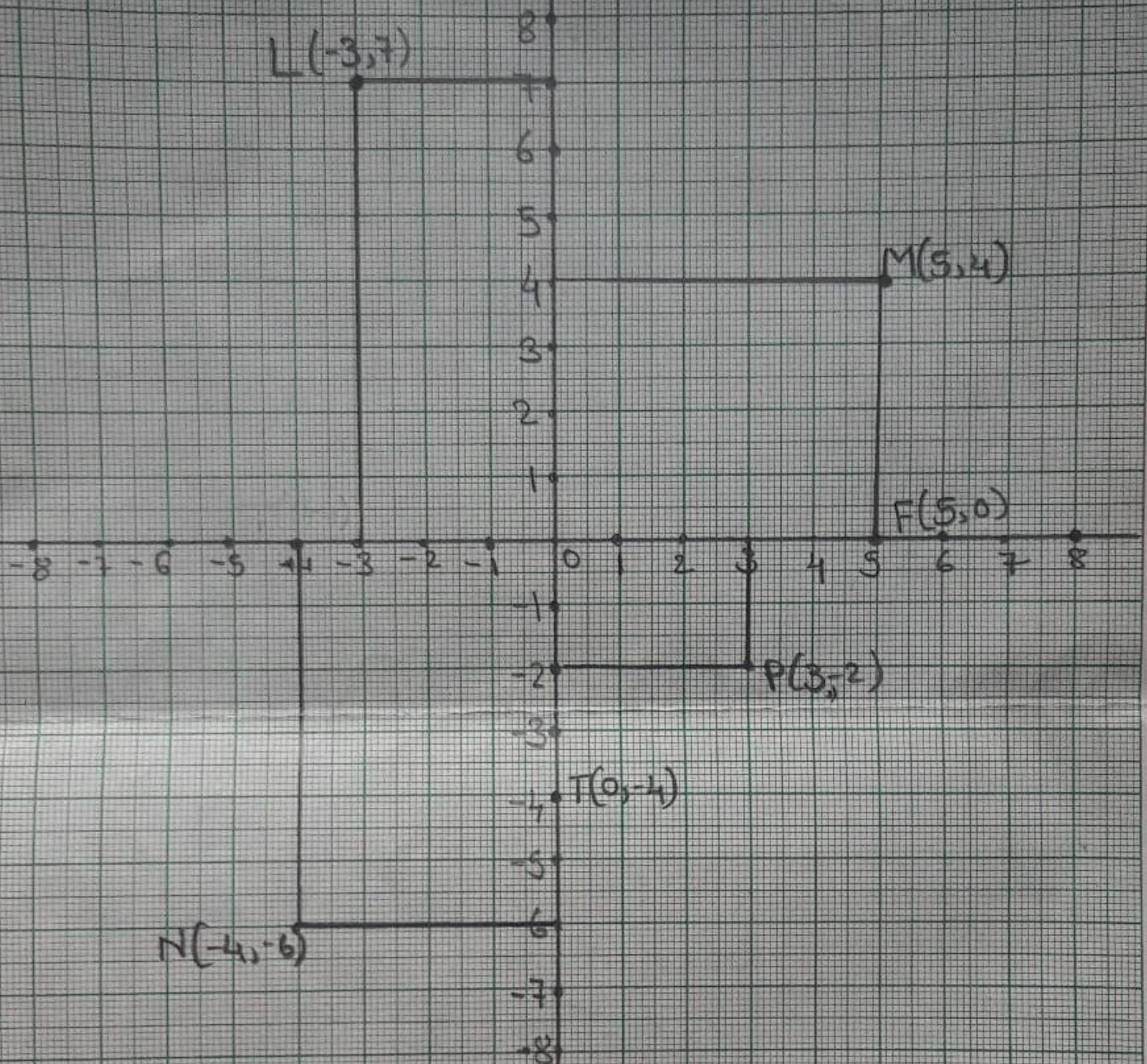
2] Equation of y -axis is $x = 0$

Plot points $P(4,0)$, $Q(4,4)$
 $R(0,4)$ on a graph Paper and
see which figure is formed.



As seen in the graph
we can see that a
square is formed.

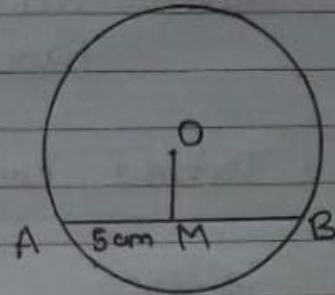
Plot the following points on
a graph paper, $L(-3, 7)$, $M(5, 4)$
 $N(-4, -6)$, $P(3, -2)$, $T(0, -4)$, $F(5, 0)$



Assignment 3

Q.1 In the given figure Seg AB is the chord of the Circle with center O. Seg OM \perp Chord AB. If AM = 5cm, find AB.

Ans Given- Seg AB is chord of circle
Center is O
OM \perp Chord AB
AM = 5cm



To find- AB

Solution

We all are well known to the theorem that a perpendicular drawn from the center of circle to the chord, bisects the chord. So here Seg OM is bisecting the chord $\therefore AM + BM = AB$ --- I
 $\therefore AM = BM$ --- II

$$AB = AM + BM \quad \text{--- I}$$

$$AB = 2AM \quad \text{--- II}$$

$$AB = 2(5)$$

$$AB = 10 \text{ cm}$$

\therefore If the value of AM = 5cm then the value of AB will be 10cm

2] If the radius of circumcircle of an equilateral triangle is 5cm, then find the radius of incircle.

Given- Triangle is an equilateral triangle.
Radius of Circumcircle = 5cm

To find- Radius of incircle.

Solution-

We know that, Ratio of radius of circumcircle to radius of incircle of an equilateral triangle is 2:1

Let the radius of incircle be x

$$\frac{5}{x} = \frac{2}{1}$$

$$\frac{1}{x} = \frac{2}{5}$$

$$\frac{1}{x} = \frac{1}{2.5}$$

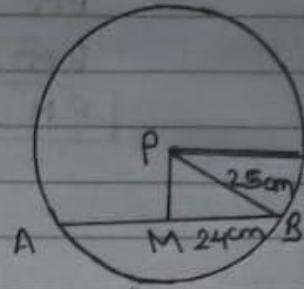
$$\therefore x = 2.5\text{cm}$$

\therefore Radius of incircle is 2.5cm.

Q.3

Radius of a circle P is with center P is 25 cm the length of the chord of the same circle is 48 cm. Find the distance of the chord from the center of the circle.

Ans Given - Radius of circle = 25 cm
Center of circle = P
Chord of circle = 48 cm



To find - Distance of chord from center P

Construction - Let chord be AB

Let PM be the distance of the Chord from Center

PB is the radius of the circle.

Solution -

$PM \perp AB$,

$\therefore AM + BM = AB$ \therefore Perpendicular drawn from the center of circle to the chord bisects the

$\therefore AM \cong BM$ -- I

$\therefore AM + BM = AB$ from Chord.

$$BM + BM = 48$$

$$2BM = 48$$

$$BM = \frac{48}{2}$$

$$\boxed{BM = 24 \text{ cm}}$$

\therefore in $\triangle PMB$, $\angle M = 90^\circ$,

\therefore by pythagoras theorem.

$$PB^2 = PM^2 + MB^2$$

$$25^2 = 24^2 + PM^2$$

$$625 = 576 + PM^2$$

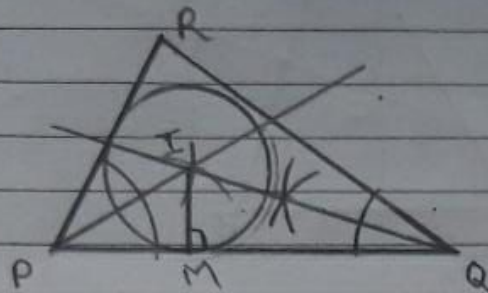
$$PM^2 = 625 - 576$$

$$PM^2 = 49$$

$$\boxed{PM = 7} \quad \because \text{Taking square roots on both the sides}$$

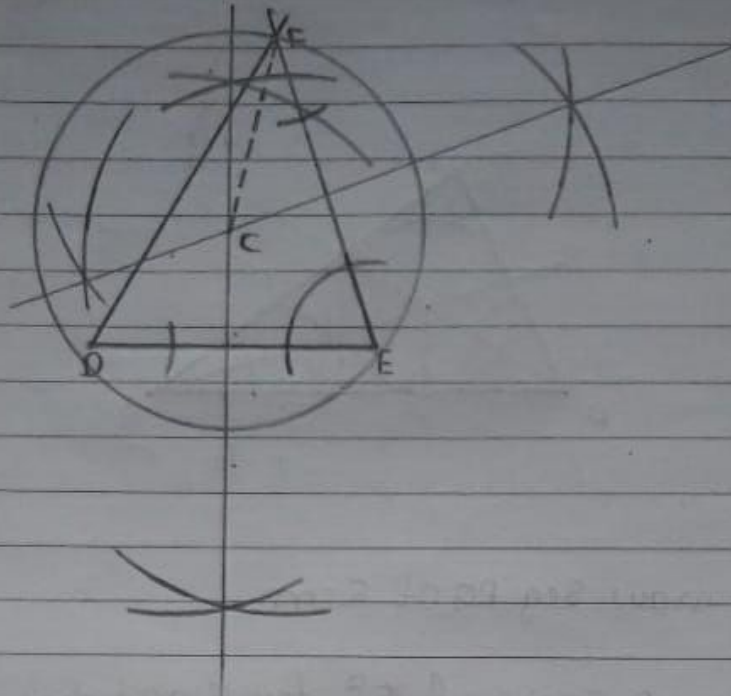
\therefore We found that the distance between chord and center of circle (PM) is 7cm

Q.4



- 1] Let us draw seg PQ of 6 cm
- 2] Make an angle of 35° for Q and draw a seg of 5.5 cm
- 3] Then join the points R and P, we have made the required triangle now.
- 4] Draw bisectors of any 2 angles of triangle (here P and Q)
- 5] Mark the point of intersection as I
- 6] Draw the perpendicular from point I to PQ.
- 7] Draw circle with center I and radius IM.
- 8] Your incircle of triangle is ready.

Q. 5



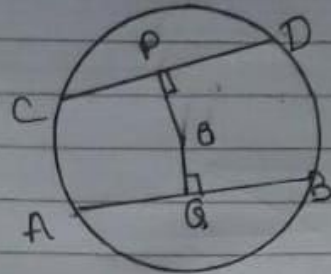
- 1] Draw DEF of required measurements
- 2] Draw perpendicular bisectors of any two sides of triangle
- 3] Name the point of intersection as C
- 4] Join seg CF
- 5] Draw circle with center C and radius CF.

Q.6

In The given figure, O is the center of the circle and $AB = CD$. If $OP = 4\text{cm}$, then find the length of OQ .

Given - Chord $AB \cong$ Chord CD
 $OP = 4\text{cm}$

To find - OQ



Solution -

We have heard about the property that the congruent chords of a circle are equidistant from the center of circle.

If same applied here, we will get the solution

As Seg OP and Seg OQ are the distance from the center of circle.

$\therefore OP = OQ$ \because The congruent chords of a circle are equidistant from the center of circle.
 $4\text{cm} = OQ$
 $\therefore OQ = 4\text{cm}$

\therefore by applying the property we found the distance of OQ as 4cm .