MKCL Creating a Knowledge Lit World www.mkcl.org	**Subject – Geometry** **Std. – 10th EM/Semi**	**Set: – I** **Time: 2 Hrs** **Marks: 40**

Q.1.A Choose the correct alternative. **[4]**

1) Altitude on the hypotenuse of a right angled triangle divides it in two parts of lengths 4 cm and 9 cm. Find the length of altitude.
A) 9 cm B) 4 cm C) 6 cm D) $2\sqrt{6}$ cm

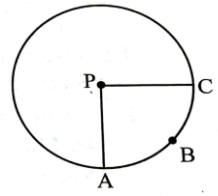
2) If point P divides segment joining $(-5, 3)$ and $(3, -5)$ in the ratio 1 : 3, then the co-ordinates of point P are
A) $(-2, -2)$ B) $(-1, -1)$ C) $(-3, 1)$ D) $(1, -3)$

3) A circle touches all sides of a parallelogram. So the parallelogram must be a _____.
A) rectangle B) rhombus C) square D) trapezium

4) If d(O, M) = 7 cm, then we can draw at the most _____ tangent segments from the point M to the circle with centre O and radius 4 cm
A) 3 B) 7 C) 2 D) 1

Q.1.B Solve any TWO of the following: **[4]**

1) In the adjoining figure, if A(P-ABC) = 154 cm^2, radius of the circle is 14 cm, find
i) ∠APC, ii) l(arc ABC).

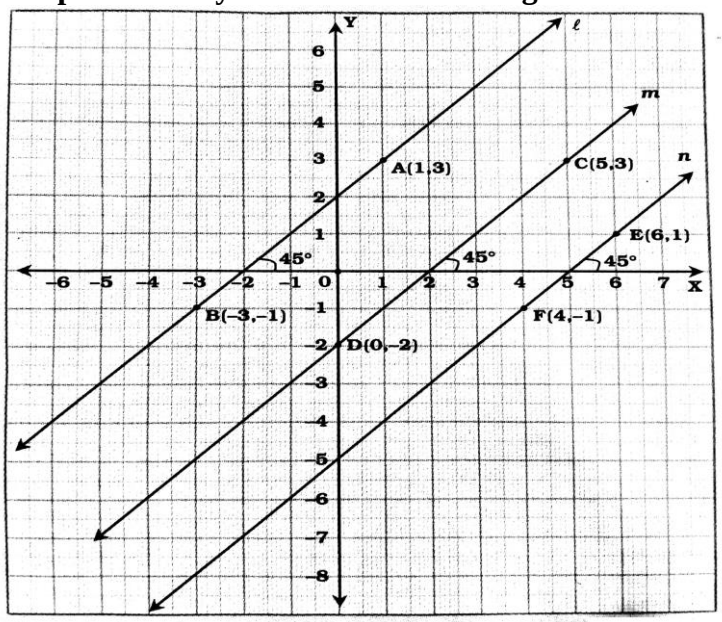


2) Find the slope of the diagonals of a quadrilateral with vertices A(1, 7), B(6, 3), C(0, −3) and (−3, 3).

3) A boy is at a distance of 60 metres from a tree and makes an angle of elevation of 60° with the top of the tree. What is the height of the tree? ($\sqrt{3}$ = 1.73)

Q.2A Complete the any TWO of the following activities: **[4]**

1)



Observe the given graph and complete following activity.
line ℓ, line m and line n make angle of 45° with the positive direction of X-axis
∴ line ℓ ∥ line m ∥ line n .....(corresponding angles test)
Now, let us find slopes of line ℓ, line m and line n using ratio $\frac{y_2-y_1}{x_2-x_1}$

∴ Slope of line ℓ = $\frac{\square - \square}{\square - \square} = \frac{\square}{\square} = \frac{\square}{\square}$

Slope of line m = $\frac{\square - \square}{\square - \square} = \frac{\square}{\square} = \frac{\square}{\square}$

Slope of line n = $\frac{\square - \square}{\square - \square} = \frac{\square}{\square} = \frac{\square}{\square}$

From this we can verify that $\square$ lines have $\square$ slopes.

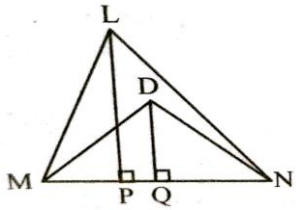
2) Complete the following activity to find $\frac{A(\Delta LMN)}{A(\Delta DMN)}$.

Sol: In ΔLMN, MN is the base and LP is the height.
In ΔDMN, MN is the base and DQ is the height.

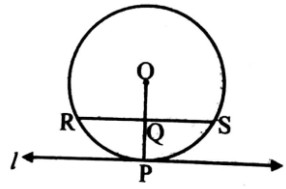
∴ $\frac{A(\Delta LMN)}{A(\Delta DMN)} = \frac{\square \times \square}{\square \times \square}$

…[The ratio of areas of two triangles is equal to the ratio of the product of their bases and corresponding heights]

$\frac{A(\Delta LMN)}{A(\Delta DMN)} = \frac{\square}{\square}$



3) In the adjoining figure, line *l* touches the circle with centre O at point P, Q is the midpoint of radius OP. RS is a chord through Q such that chords RS ∥ line *l*. If RS = 12, find the radius of the circle.



Sol: Let the radius of the circle be r.
line *l* is the tangent to the circle and
seg OP is the radius. ……[Given]
∴ seg $\square$ ⊥ line *l* .....[Tangent theorem]
chord RS ∥ line *l* ….[Given]
∴ seg OP ⊥ $\square$
∴ QS = $\frac{1}{2}\square$
……[Perpendicular drawn from the centre of the circle to the bisects the chord]
$= \frac{1}{2} \times 12$
$= 6$ cm
Also, $\square = \frac{1}{2}$ OP ……[Q is the midpoint of OP]
$= \frac{1}{2}$ r
In ΔOQS, ∠OQS = 90° …….[seg OP ⊥ chord RS]
∴ $OS^2 = \square + QS^2$ ….. $\square$
∴ $r^2 = \square + 6^2$
∴ $r^2 = \frac{1}{4} r^2 + 36$

$\therefore r^2 - \frac{1}{4} r^2 = 36$

$\therefore \frac{3}{4} r^2 = 36$

$\therefore r^2 = \frac{36 \times 4}{3}$

$\therefore r^2 = \square$ ……..[Taking square root of both sides]

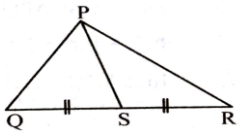
$\therefore r = \sqrt{48}$

$= \square$

$\therefore$ The radius of the given circle is $\square$ cm.

Q.2.B Solve any TWO of the following: **[4]**

1) In ΔPQR, point S is the midpoint of side QR. If PQ = 11, PR = 17, PS = 13, find QR.

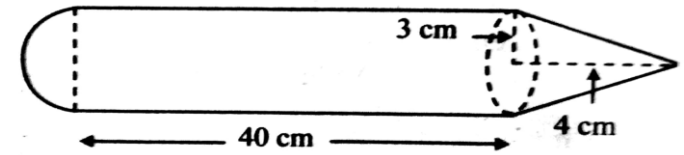


2) Radius of a circle is 10 cm. Measure of an arc of the circle is 54°. Find the area of the sector associated with the arc and length of the arc. (π = 3.14)

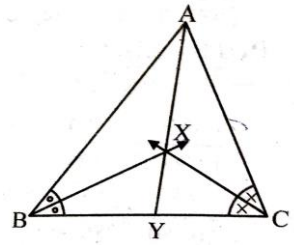
3) □MRPN is cyclic, $\angle R = (5x - 13)^\circ$, $\angle N = (4x + 4)^\circ$. Find measures of ∠R and ∠N.

Q.3 Solve any THREE of the following: **[9]**

1) In the given figure, a toy made from a hemisphere, a cylinder and a cone is shown. Find the total area of the toy. (Express your answer in terms of π)

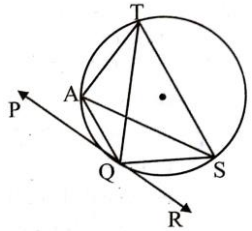


2) In the adjoining figure, bisectors of ∠B and ∠C of ΔABC intersect each other in point X. Line AX intersects side BC in point Y. AB = 5, AC = 4.
BC = 6, then find $\frac{AX}{XY}$.



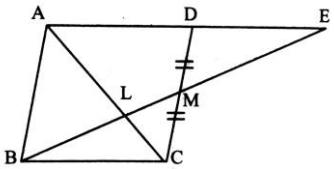
3) Prove that: $\frac{\tan\theta}{\sec\theta - 1} = \frac{\tan\theta + \sec\theta + 1}{\tan\theta + \sec\theta - 1}$.

4) In the adjoining figure, line PR touches the circle at point Q. Answer the following questions with the help of the figure.
i) What is the sum of ∠TAQ and ∠TSQ?
ii) Find the angles which are congruent to ∠AQP.
iii) Which angles are congruent to ∠QTS?
iv) ∠TAS = 65°, find the measures of ∠TQS and arc TS.

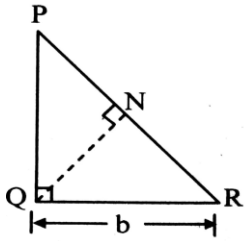


Q.4 Solve any ONE of the following **[4]**

1) Through the mid point M of the side CD of parallelogram ABCD, the line BM is drawn intersecting AC in L and AD produced in E. Prove that EL = 2BL.



2) ΔPQR is a right angled triangle, right angled at Q such that QR = b and A(ΔPQR) = a. If QN $\perp$ PR then show that QN = $\frac{2a.b}{\sqrt{b^4+4a^2}}$



Q.5 Solve any ONE of the follwing: **[3]**

1) Given: $\Delta PQR \sim \Delta PST$ such that $\frac{PR}{PT} = \frac{3}{5}$ & PQ = 7.3 cm & PR = 6.5 cm & $\angle RPQ = 70°$
Construct ΔPQR and then construct ΔPST by dividing seg PQ in 3 equal parts and then finding out position of point S on line PQ such that P – Q – S and $\frac{PQ}{PS} = \frac{3}{5}$

2) If $\sin(A + B + C) = 1$. $\tan(A - B) = \frac{1}{\sqrt{3}}$, $\cos(A + C) = \frac{1}{2}$, then find the values of A, B and C. using the values of trigonometric ratios at angles 0°, 30°, 45°, 60° and 90°.

*This question paper is for practice purpose only.