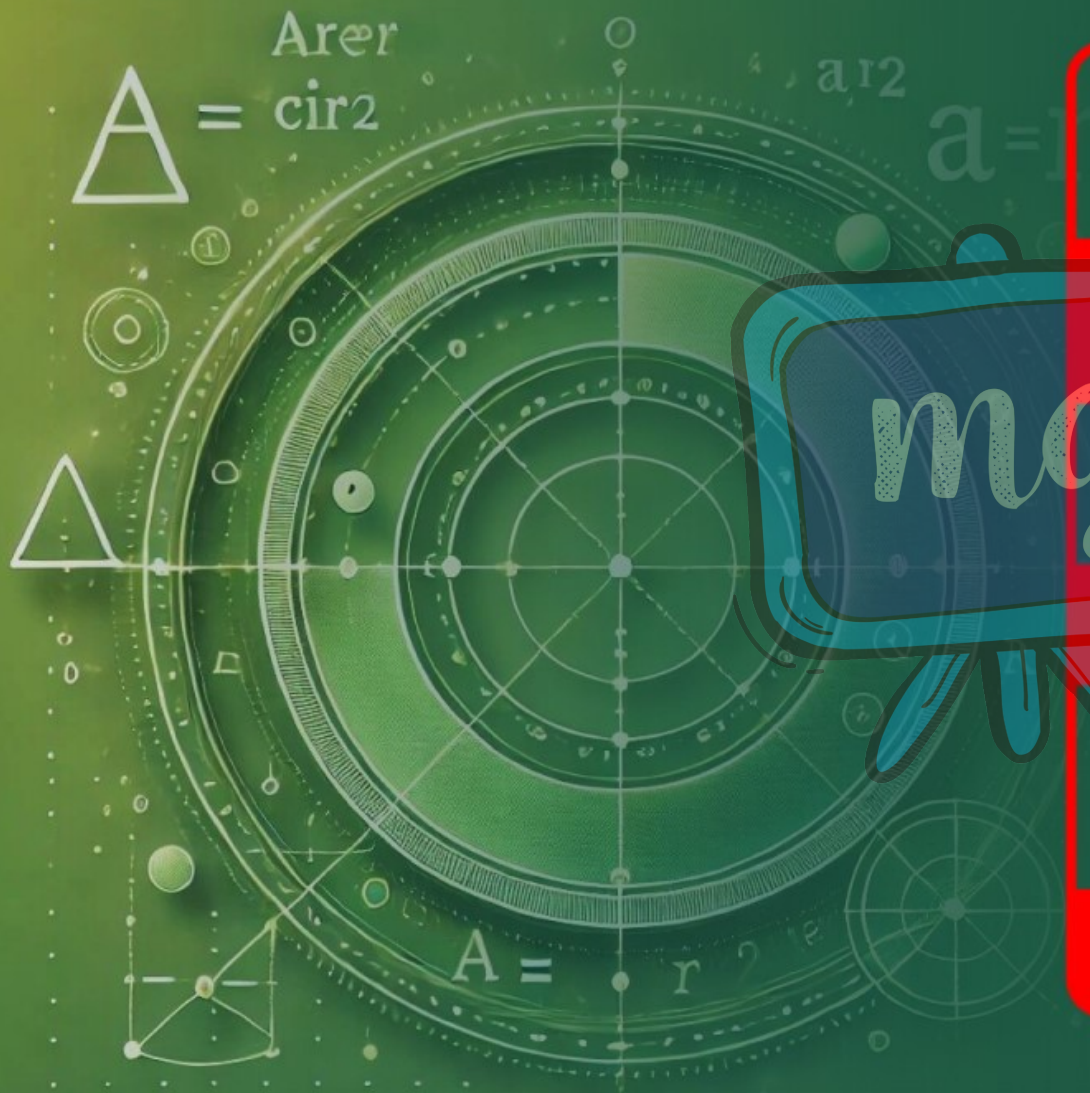


CLASS – 10

MATHEMATICS

CH – 10 : CIRCLES

CBSE Board

Previous Year Questions – 3

Shubham Tiwari

26. In Figure, O is centre of a circle of radius 5 cm. PA and BC are tangents to the circle at A and B respectively. If OP = 13 cm, then find the length of tangents PA and BC.

(CBSE Term II, 2022)

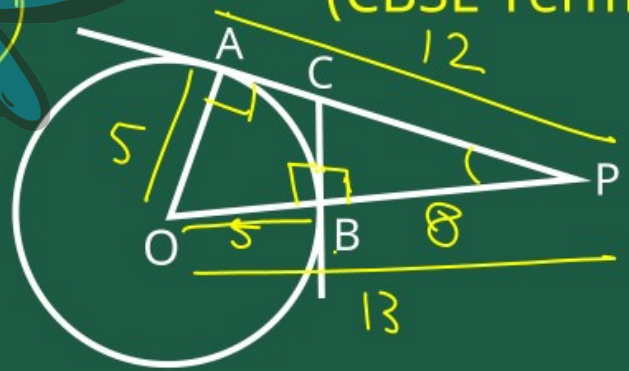
$PA^2 = OP^2 - OA^2$

$= 13^2 - 5^2$

$= 169 - 25$

$PA^2 = 144$

$PA = 12$ cm



In $\triangle PAO$ & $\triangle PBC$

$\angle PBC = \angle PAO = 90^\circ$

$\angle P = \angle P$ {common}

AA Similarity Rule $\triangle PAO \sim \triangle PBC$

$$\frac{PA}{PB} = \frac{AO}{BC} = \frac{PO}{PC}$$

$$\frac{3}{8} = \frac{5}{BC}$$

$$3BC = 10$$

$$BC = 10/3 \text{ cm}$$

27. In fig. PQ is a chord of length 8 cm of a circle of radius 5 cm. The tangents at P and Q meet at a point T. Find the length of TP.

(CBSE Term II, 2022)

In $\triangle PMO$

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

$= \frac{1}{2}(8)$

$PM = 4\,cm$

$OP = 5\,cm.$

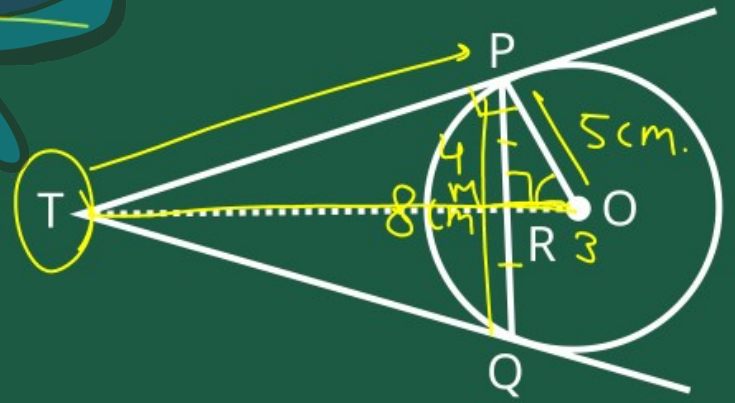
$OM = 3$

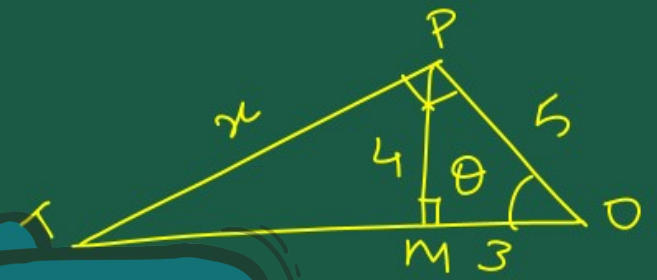
$OM^2 = OP^2 - PM^2$

$= 5^2 - 4^2$

$= 25 - 16$

$OM^2 = 9$





In ΔPTO $\tan\theta = \frac{P}{B} = \frac{x}{5}$

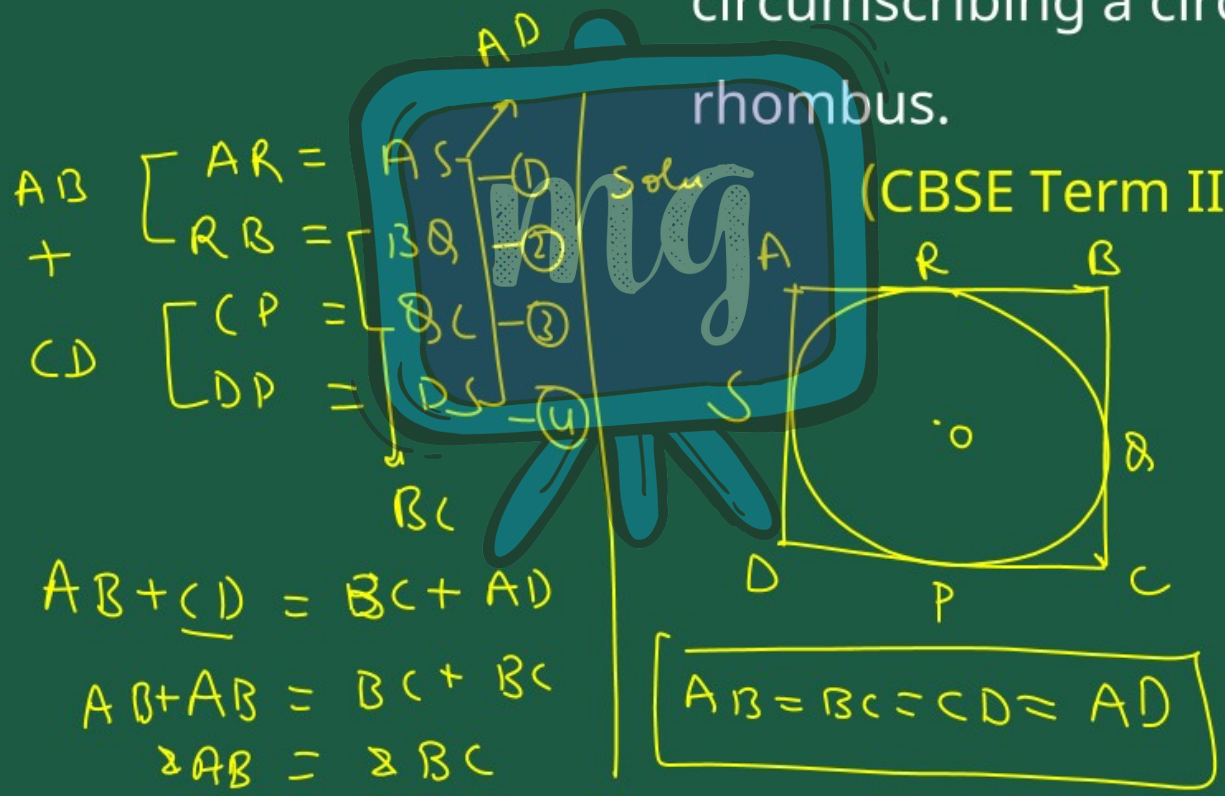
In ΔPMO $\tan\theta = \frac{P}{B} = \frac{PM}{MO} = \frac{4}{3}$

$\tan\theta = \frac{x}{5} = \frac{4}{3}$

$x = \frac{20}{3}$ cm

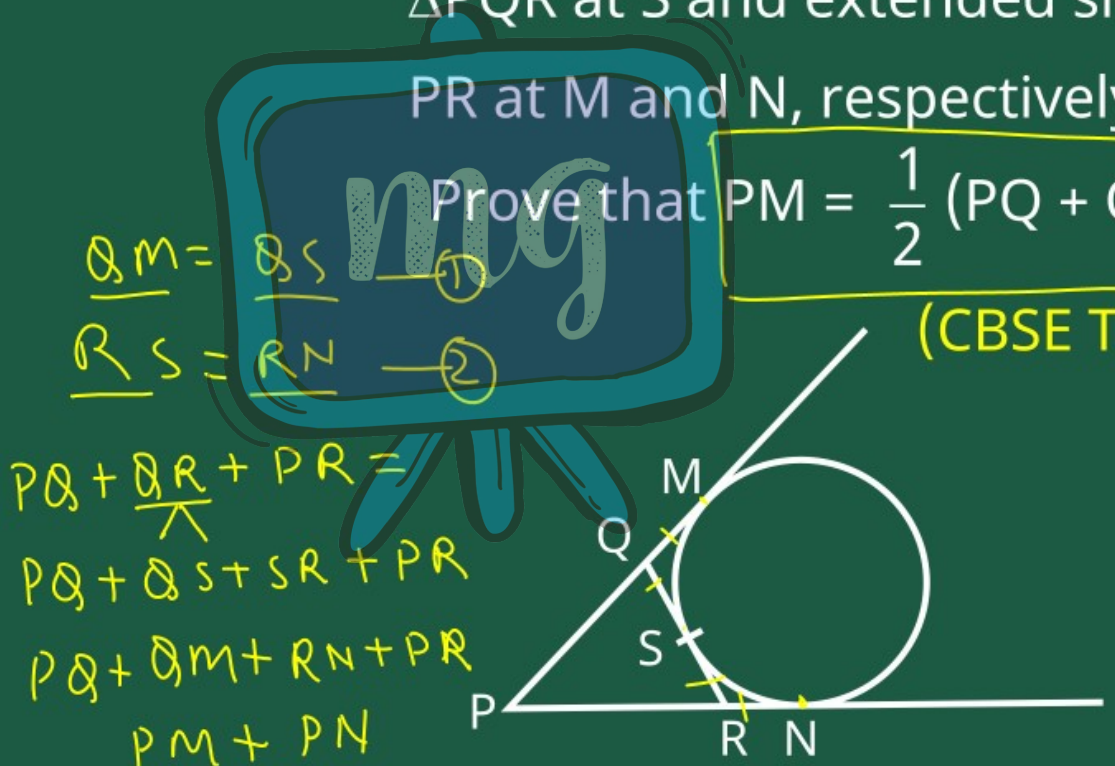
28. Prove that a parallelogram circumscribing a circle is a rhombus.

(CBSE Term II, 2022, NCERT)



29. In fig, if a circle touches the side QR of ΔPQR at S and extended sides PQ and PR at M and N, respectively. Then Prove that $PM = \frac{1}{2}(PQ + QR + PR)$

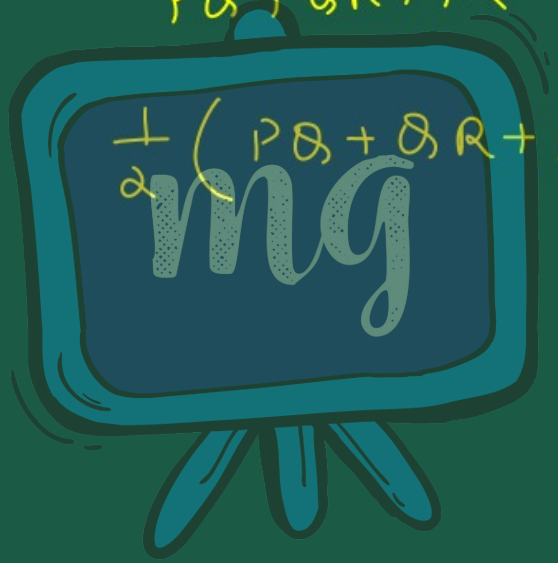
(CBSE Term II, 2022)



$$PQ + QR + PR = PM + PN$$

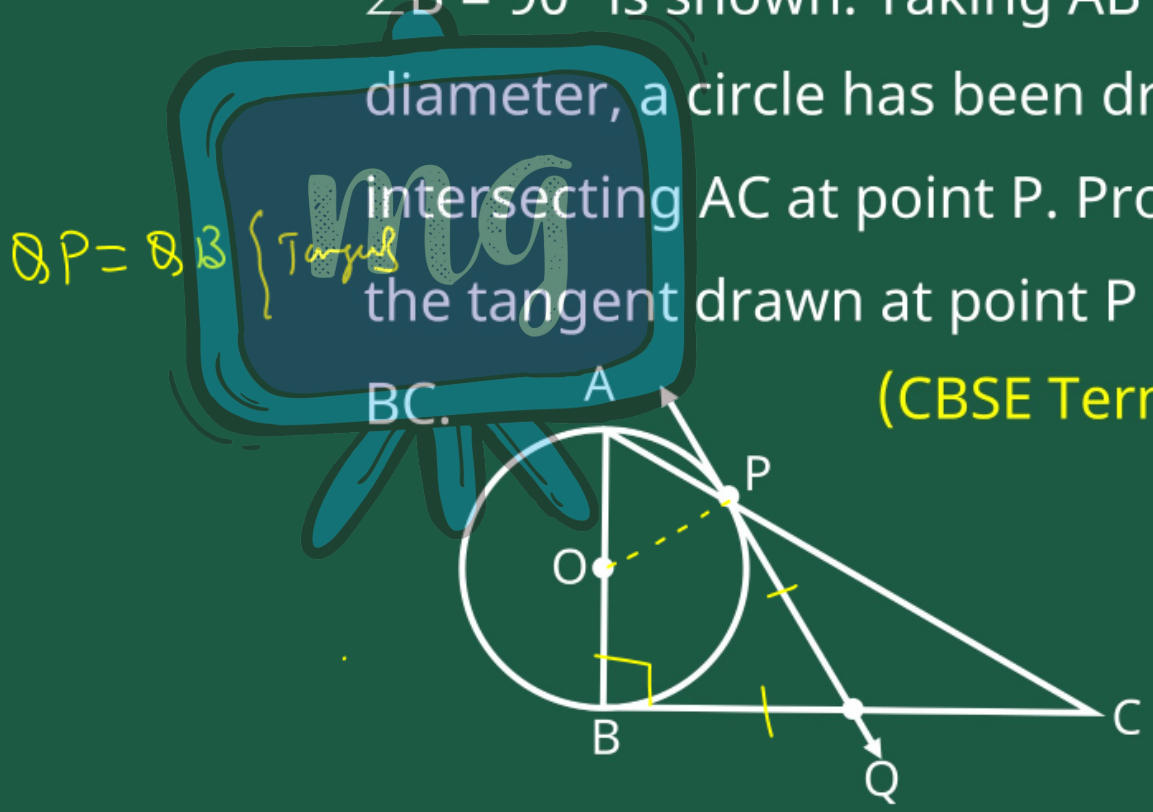
$$PQ + QR + PR = 2PM \quad \{PM = PN\}$$

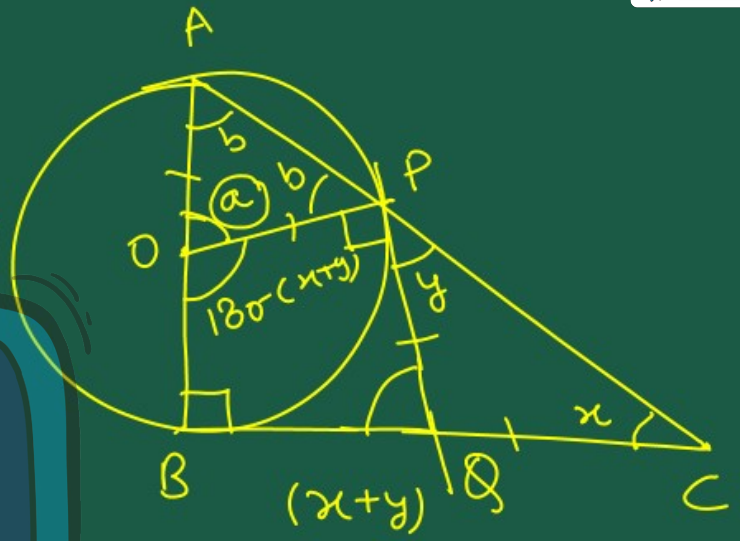
$$\frac{1}{2}(PQ + QR + PR) = PM$$



30. In figure, a triangle ABC with angle $\angle B = 90°$ is shown. Taking AB as diameter, a circle has been drawn intersecting AC at point P. Prove that the tangent drawn at point P bisects BC.

(CBSE Term II, 2022)





$\angle BOQ = \angle OPQ$ — (1)

$\angle OQC = \angle OPQ$ — (2)

$b + b + a = 180^\circ$

$2b + a = 180^\circ$

$2b = 180 - a$

$2\angle b = 180 - (\angle x + \angle y)$

$\angle b = \frac{180 - (x+y)}{2}$

$\angle b + 90^\circ + \angle y = 180$

$\angle b + \angle y = 90^\circ$

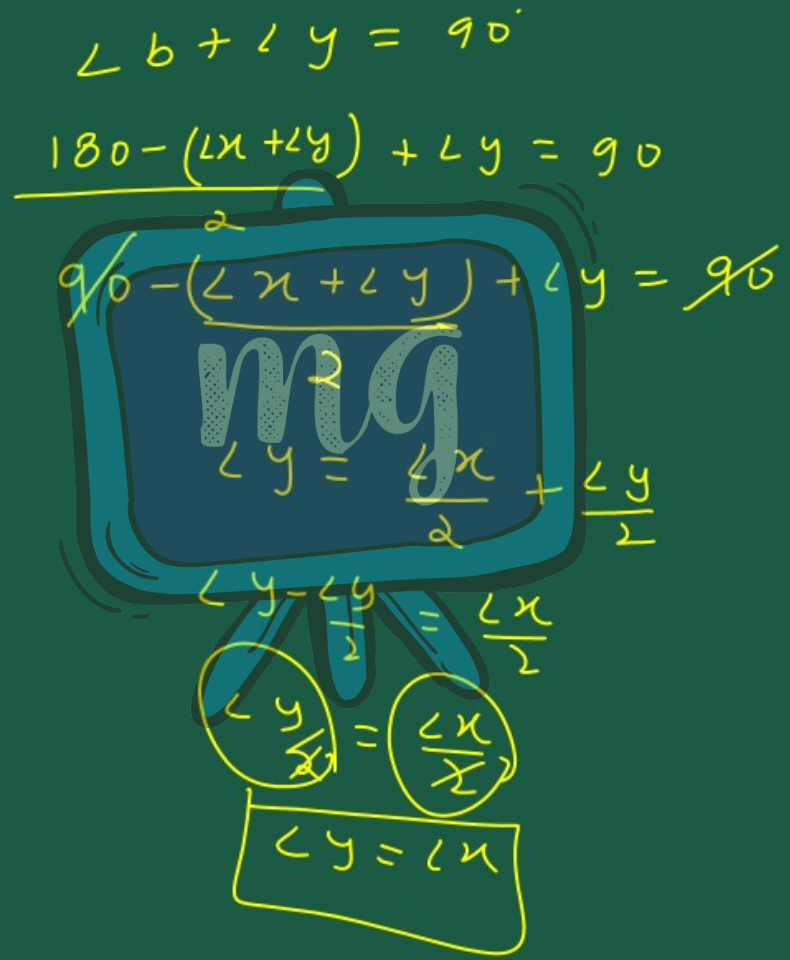
$\angle O = 180 - (x+y)$

$\angle AOP = a$

$a + \angle O = 180^\circ$ {L.P}

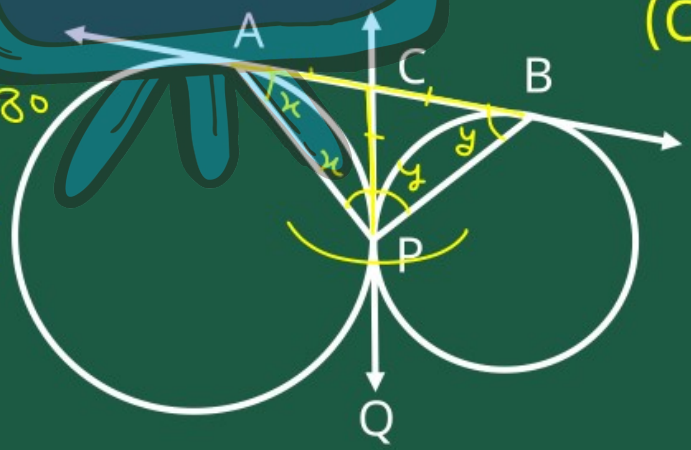
$a + 180 - \angle x + \angle y = 180$

$a = \angle x + \angle y$



31. In figure, two circles touch externally at P. A common tangent touches them at A and B and another common tangent is at P, which meets the common tangent AB at C. Prove that ∠APB = 90°.

(CBSE Term II, 2022)



In △ ABP

∠x + ∠x + ∠y + ∠y = 180

2∠x + 2∠y = 180

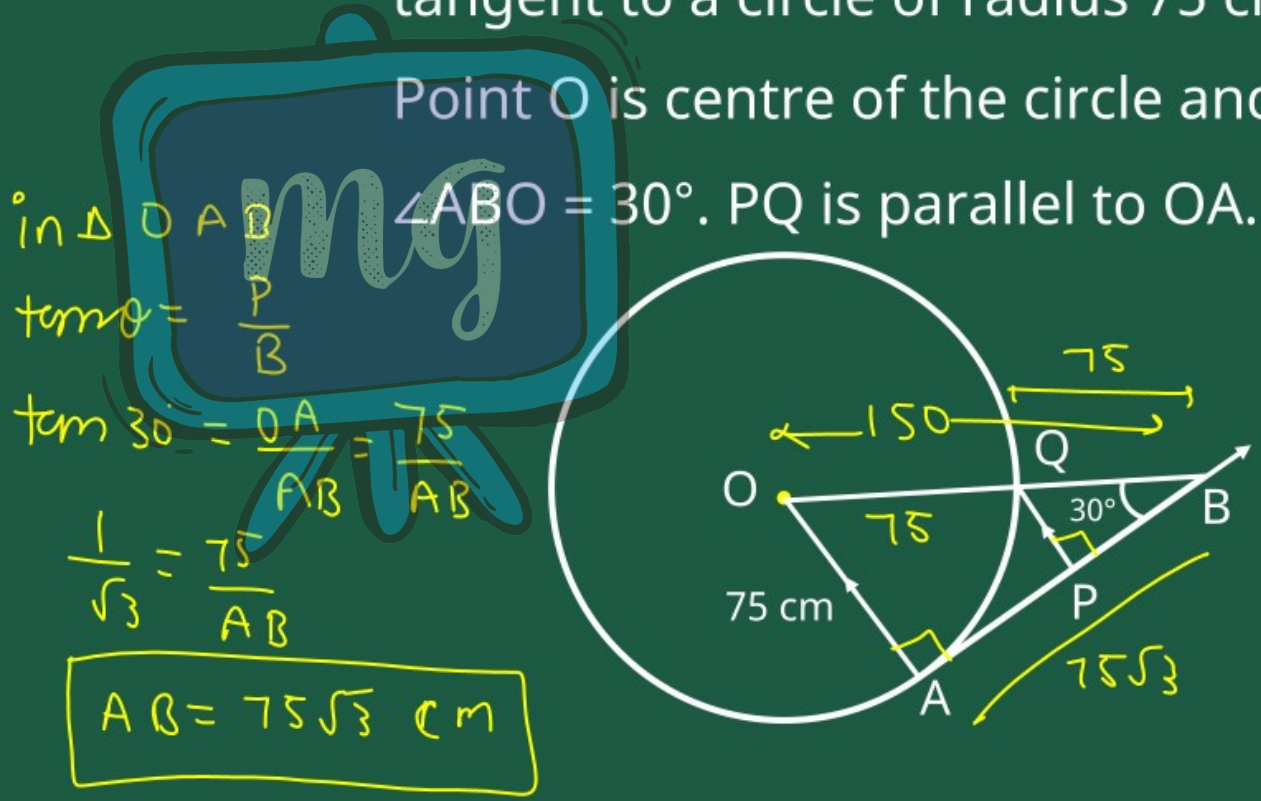
∠x + ∠y = 90

∠APB = 90°

H.P.

32. **Case Study :** The discus throw is an event in which an athlete attempts to throw a discus. The athlete spins anti-clockwise around one and a half times through a circle, then releases the throw. When released, the discus travels along tangent to the circular spin orbit.

In the given figure, AB is one such tangent to a circle of radius 75 cm. Point O is centre of the circle and ∠ABO = 30°. PQ is parallel to OA.



Based on above information:

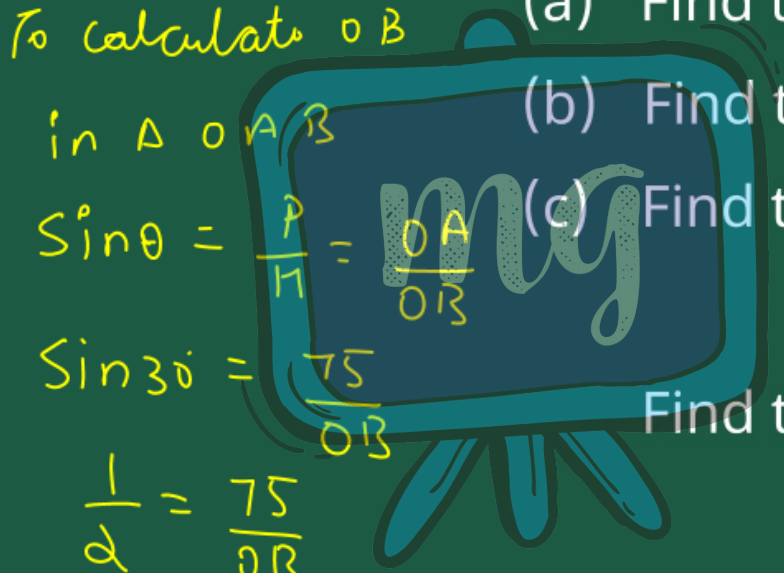
(a) Find the length of AB.

(b) Find the length of OB.

(c) Find the length of AP.

OR

Find the length of PQ.



To calculate OB

in ΔOAB

$\sin\theta = \frac{P}{H} = \frac{OA}{OB}$

$\sin 30^\circ = \frac{75}{OB}$

$\frac{1}{2} = \frac{75}{OB}$

$OB = 150\,cm$

In ΔOAB

By BPT $\{QP \parallel OA\}$

$$\frac{BQ}{QO} = \frac{BP}{PA}$$

$\{BQ = QO = 75\}$

$$1 = \frac{BP}{PA}$$

$BP = PA$

Hence $PA = \frac{1}{2} AB = \frac{1}{2} 75\sqrt{3}$

$$PA = \frac{75\sqrt{3}}{2}$$

In $\triangle OAB$ & $\triangle BQP$

$\angle B = \angle B$ {Common}

$\angle BAO = \angle BPQ = 90^\circ$ { $QP \parallel OA$ }

By AA similarity Rule

$\triangle BQP \sim \triangle BOA$

$$\frac{BQ}{BO} = \frac{QP}{OA} = \frac{BP}{BA}$$

$$\frac{BQ}{BO} = \frac{QP}{OA}$$

$$\frac{75}{150} = \frac{QP}{75}$$

$$\frac{1}{2} = \frac{QP}{75}$$

$$\frac{75}{2} = QP = 37.5$$