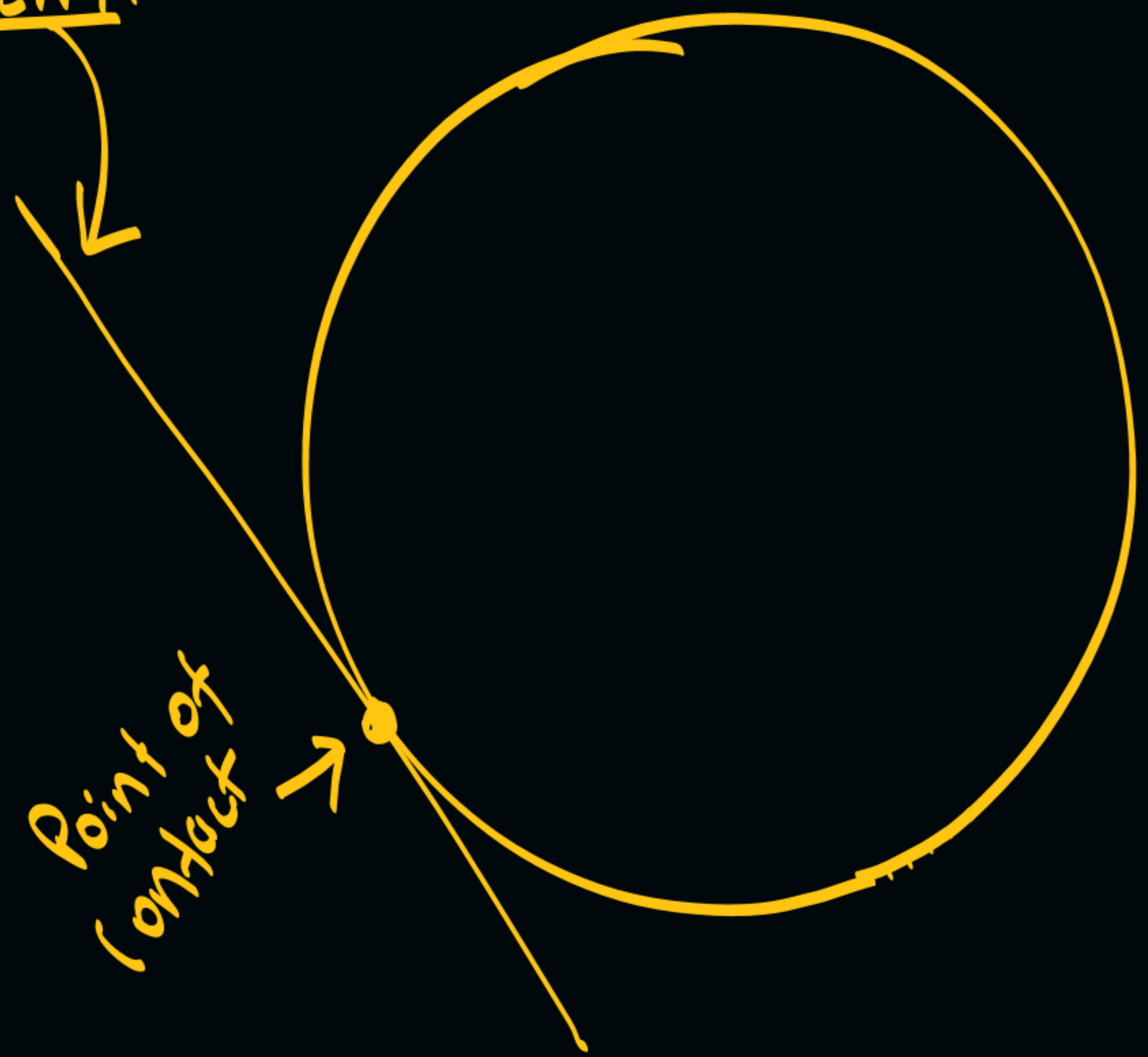
(Aim: 100/100 in Maths)

अभय CLASS 10

CIRCLES

L - 1

TANGENT:-



Theorem ~~#1~~: A tangent to a circle is perpendicular to the radius through the point of contact.

Given: A circle with centre O.
A tangent AB, P → point of contact.

To prove: $OP \perp AB$.

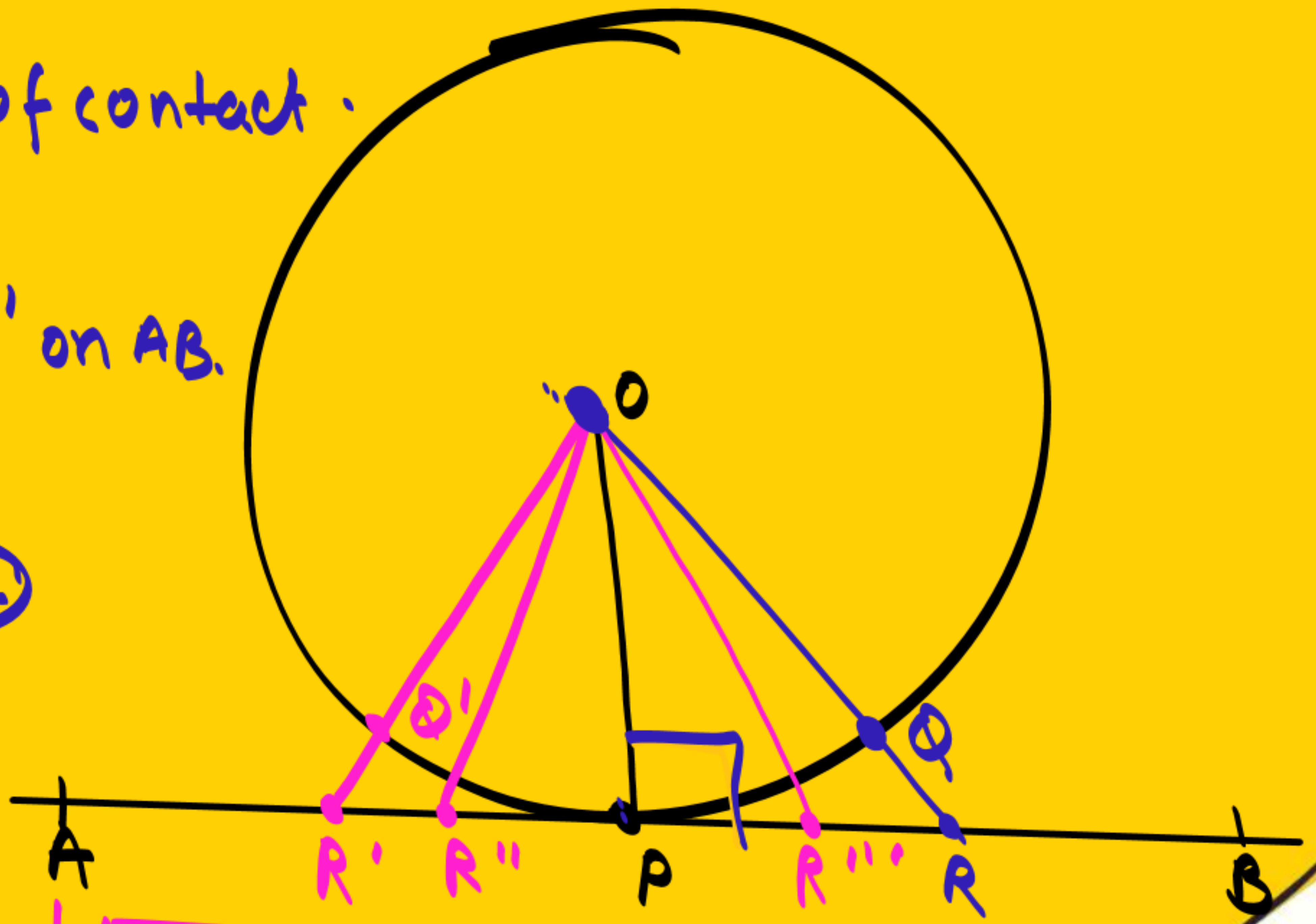
Construction: A point other than P 'R' on AB.
Join O to R.

Proof:
OQ = OP (both radius) — (1)

$\boxed{OR > OQ}$

$\boxed{OR > OP}$ (from (1))

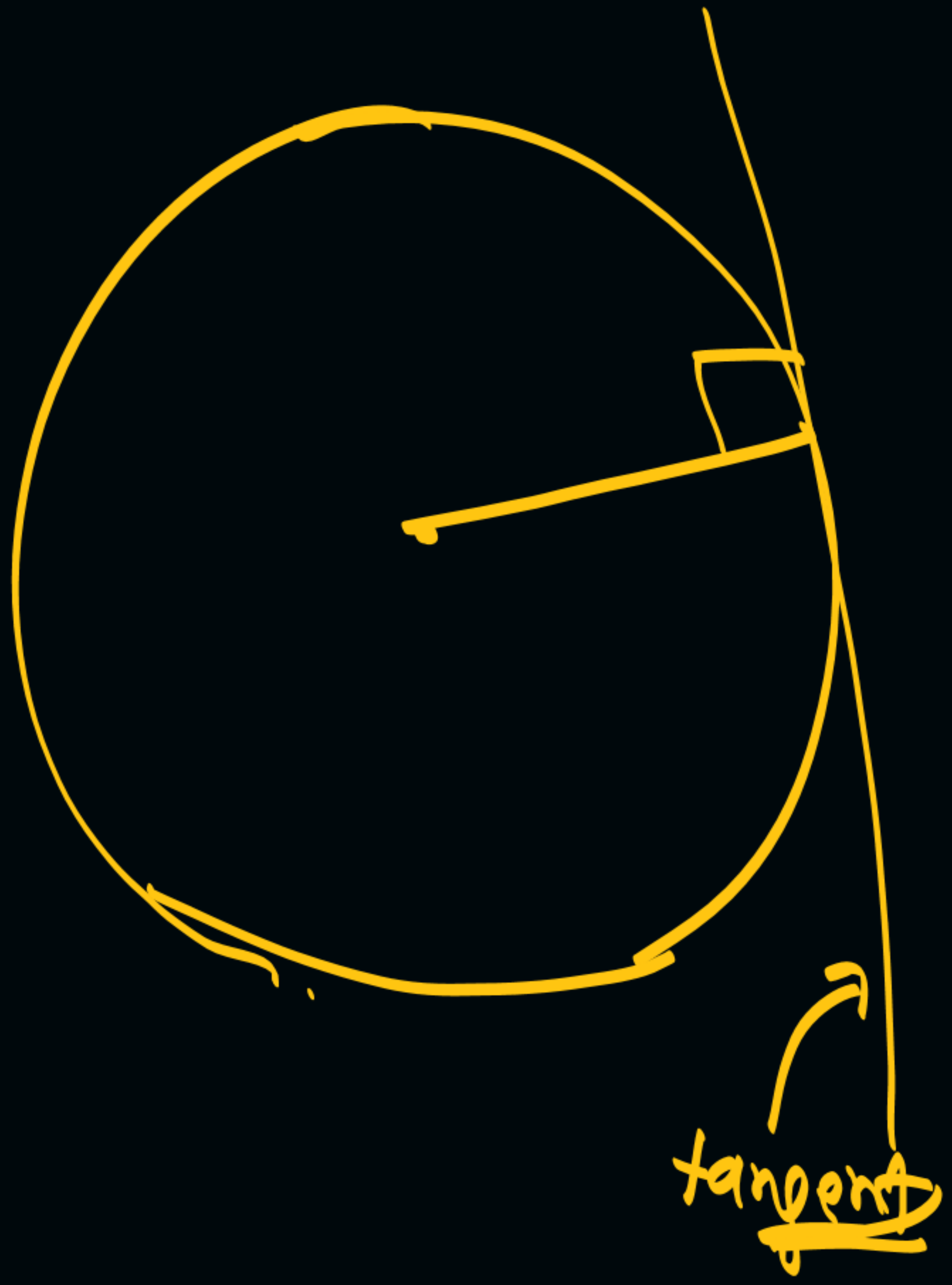
Slly, OQ' = OP (both radius)
OR' > OQ'
$\boxed{OR' > OP}$



$\boxed{OR, OR', OR'', OR''' > OP}$

∴ OP is the shortest distance b/w centre and AB.

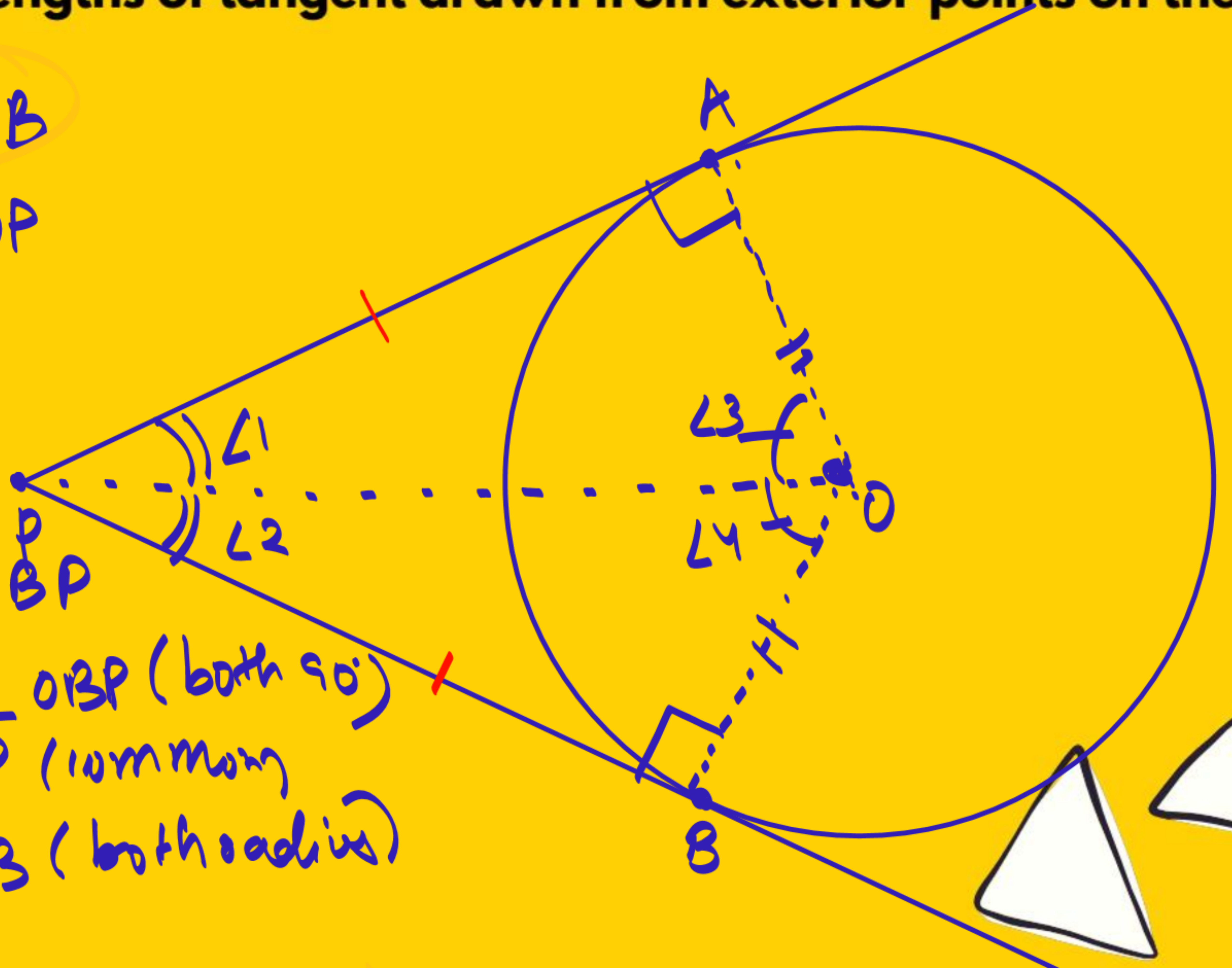

O


tangent

#THEOREM (Proof) : Lengths of tangent drawn from exterior points on the circle are equal .

To prove :- PA = PB

Construction Join OP



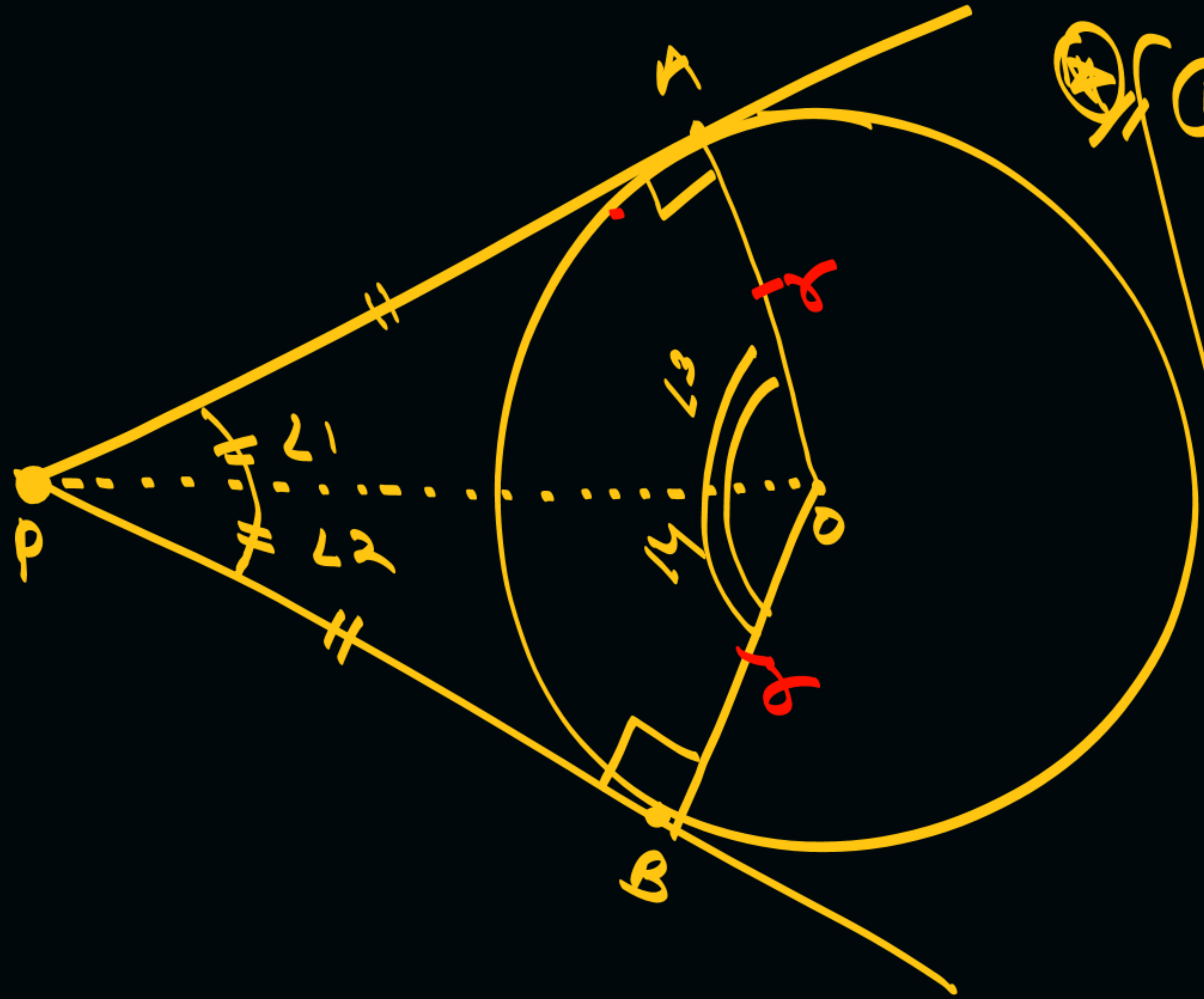
Proof: In ΔOAP & ΔOBP

∠OAP = ∠OBP (both 90°)

OP = OP (common)

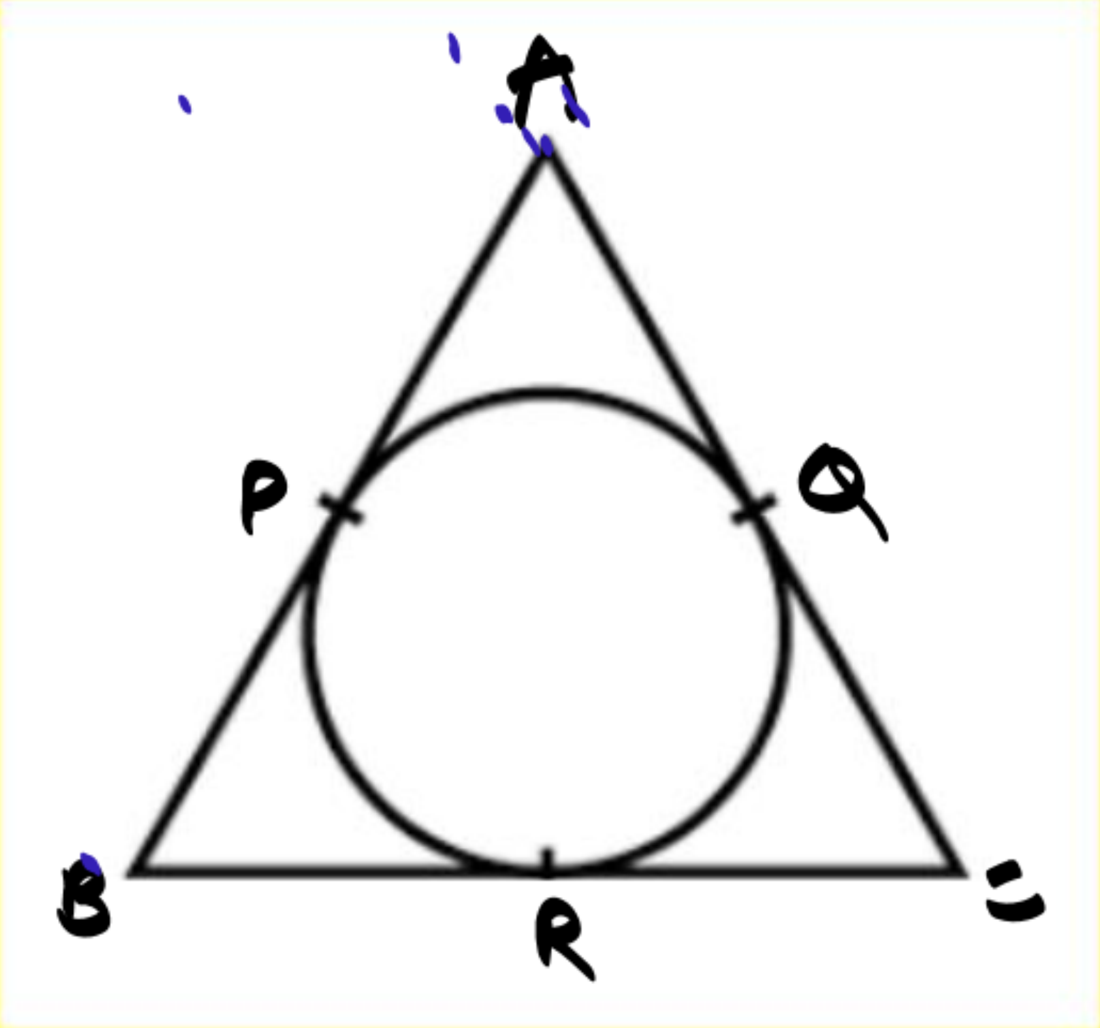
OA = OB (both radius)

V. Imp



1. $OA \perp PA$
   $OB \perp PB$
2. $PA = PB$
3. $\angle 1 = \angle 2$
4. $\angle 3 = \angle 4$
5. $OA = OB$ (both r)

#LP : ABC is an isosceles triangle in which AB = AC, circumscribed about a circle, as shown in fig. Prove that the base is bisected by the point of contact.



Given: $\boxed{AB = AC}$

To prove: $BR = RC$

Proof:

$BR = BP$
$CR = CQ$
$AP = AQ$
(length of tangents from ext point are equal) — (I)

Now, given ⇒ $AB = AC$

$AP + PB = AQ + QC$

$PB = QC$

$BR = CR$ HP

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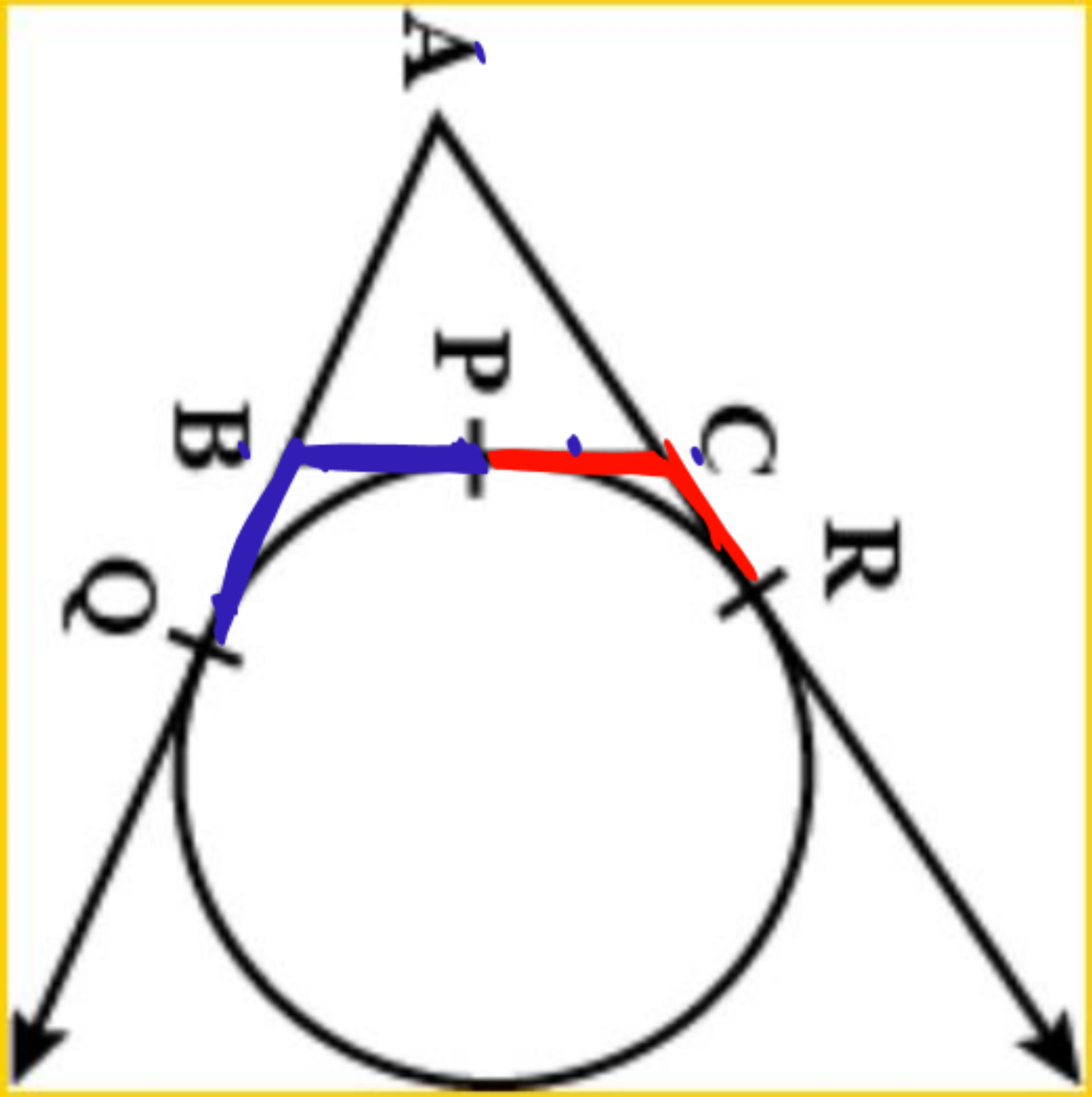
#LP : A circle is touching the side BC of triangle ABC at P and touching AB and AC produced at Q and R respectively . Prove that AQ = 1/2 (Perimeter of triangle ABC)



To prove :- $\boxed{AQ = \frac{1}{2}(\text{Per. } \Delta ABC)}$

Proof :- $AQ = AR$
$BP = BQ$
$CP = CR$ (length of tang.) — (I)

RHS $\Rightarrow \frac{1}{2}(\text{Per } \Delta ABC)$

$\Rightarrow \frac{1}{2}(AB + BC + CA)$

$\Rightarrow \frac{1}{2}(AQ - BQ + BP + PC + AR - CR)$

$\Rightarrow \frac{1}{2}(AQ - \cancel{BQ} + \cancel{BQ} + \cancel{CR} + AQ - \cancel{CR}) \Rightarrow \frac{1}{\cancel{2}}(\cancel{2}AQ) \Rightarrow AQ$ (RHS) HP

#LP : A circle touches all the four sides of a quadrilateral ABCD . Prove that : AB + CD = BC + DA.

Proof:

DR = DS — (I)

CR = CQ — (II)

AP = AS — (III)

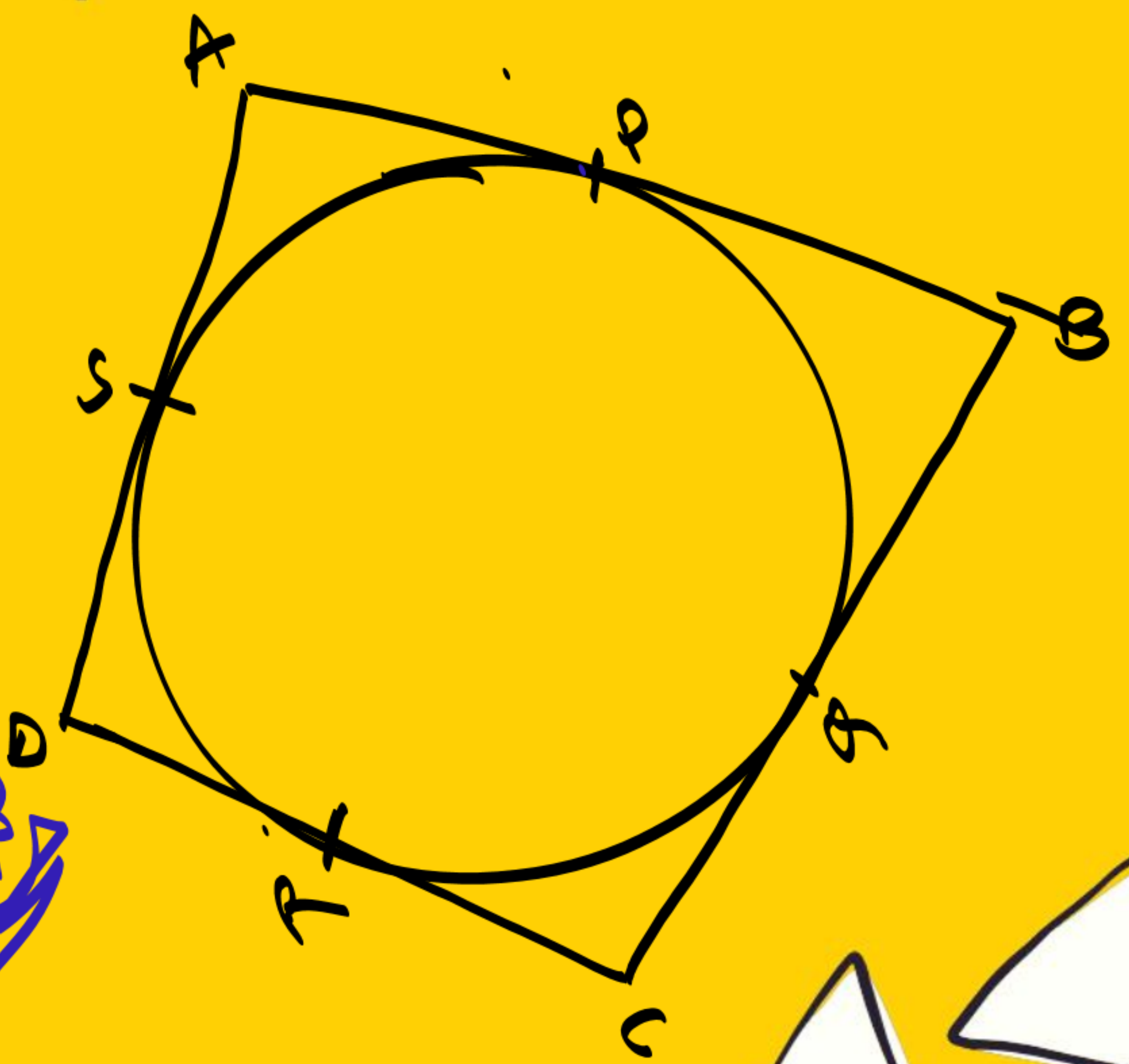
BP = BQ — (IV)

[length of tangents from ext. point to circle are equal.]

adding (I) + (II) + (III) + (IV)

DR + CR + AP + BP = DS + CQ + AS + BQ

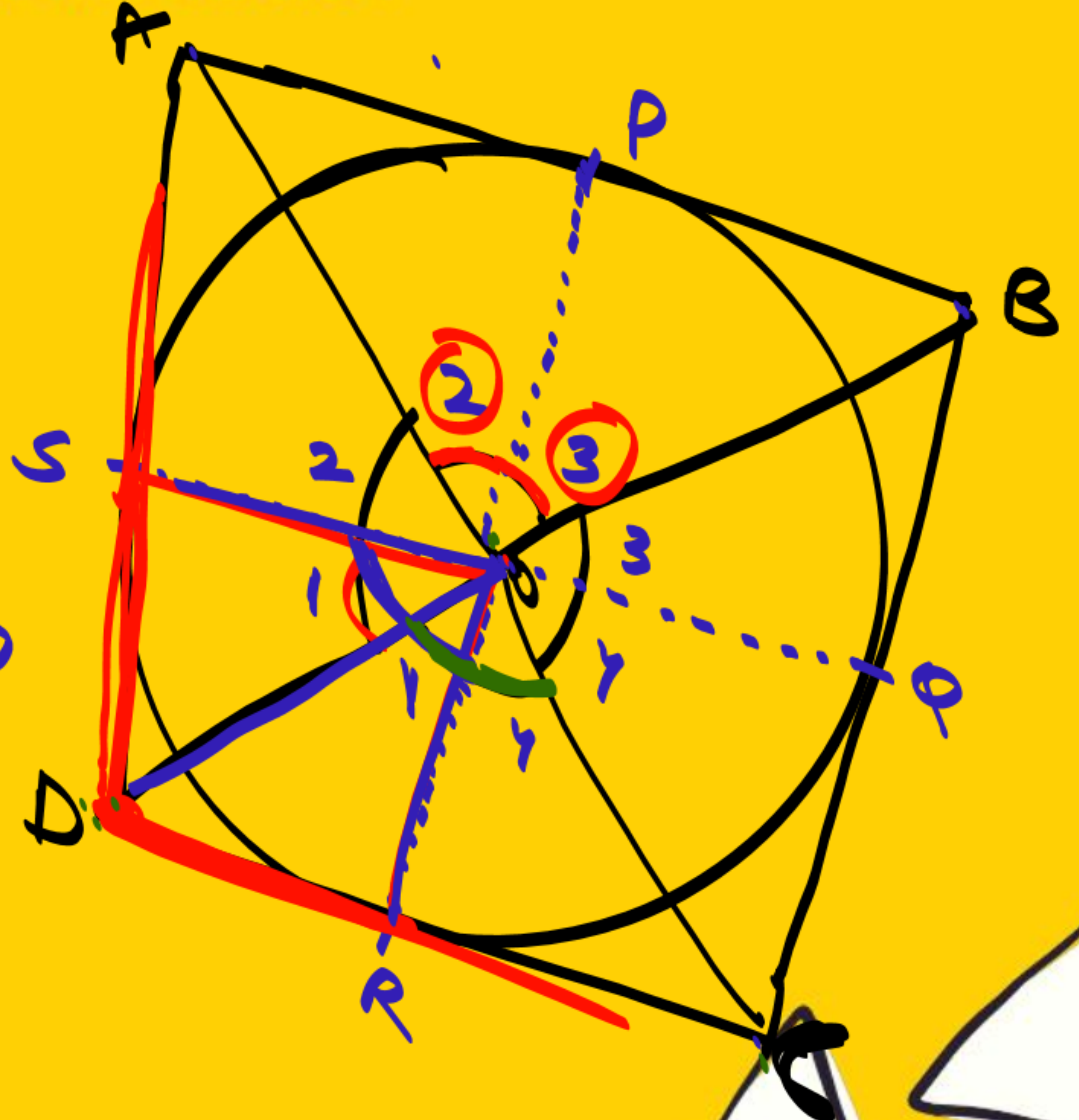
$\boxed{CD + AB = AD + BC}$ HP



#LP : Prove that opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle .

To prove: $\angle AOB + \angle COD = 180°$

Const: Join OP, OQ, OR, OS



Proof

$\angle 1 + \angle 1 + \angle 2 + \angle 2 + \angle 3 + \angle 3 + \angle 4 + \angle 4 = 360$

$2\angle 1 + 2\angle 2 + 2\angle 3 + 2\angle 4 = 360$

$\cancel{2}(\angle 1 + \angle 2 + \angle 3 + \angle 4) = \cancel{360}\ 180$

$\angle 1 + \angle 2 + \angle 3 + \angle 4 = 180$

$\boxed{\angle COD + \angle AOB = 180°}$

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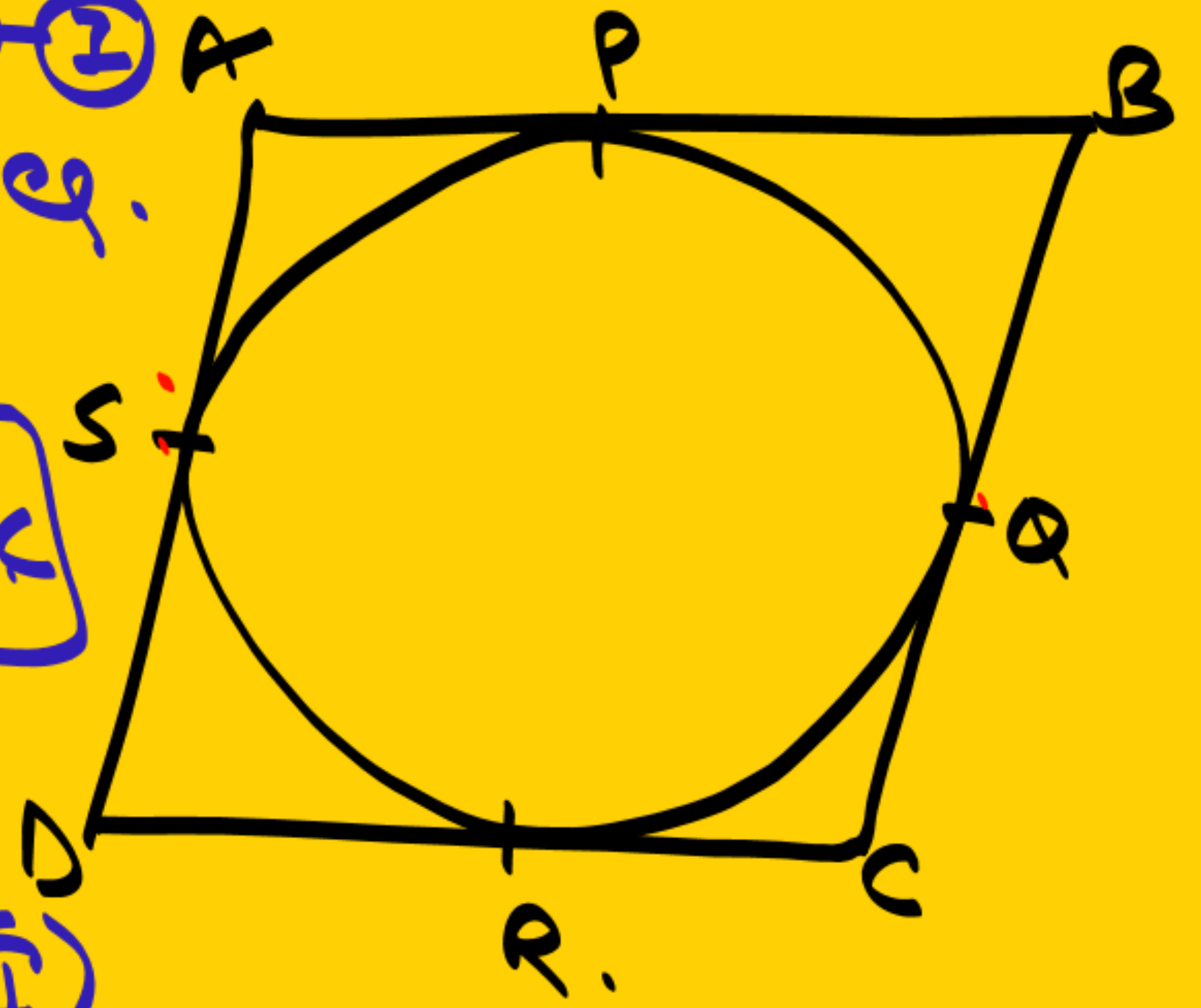
#LP : If all the sides of a parallelogram touch a circle , show that the parallelogram is a rhombus.

Given:- ABCD is ||gm → opp sides equal

$AB = CD$

$AD = BC$ — (I)

To prove: ABCD is rhombus → All sides eq.



Proof:- from prev. Q ⇒ $\boxed{AB + CD = AD + BC}$

$\cancel{2}AB = \cancel{2}AD$

$AB = AD$ — (II)

from (I) & (II)

$CD = AD$

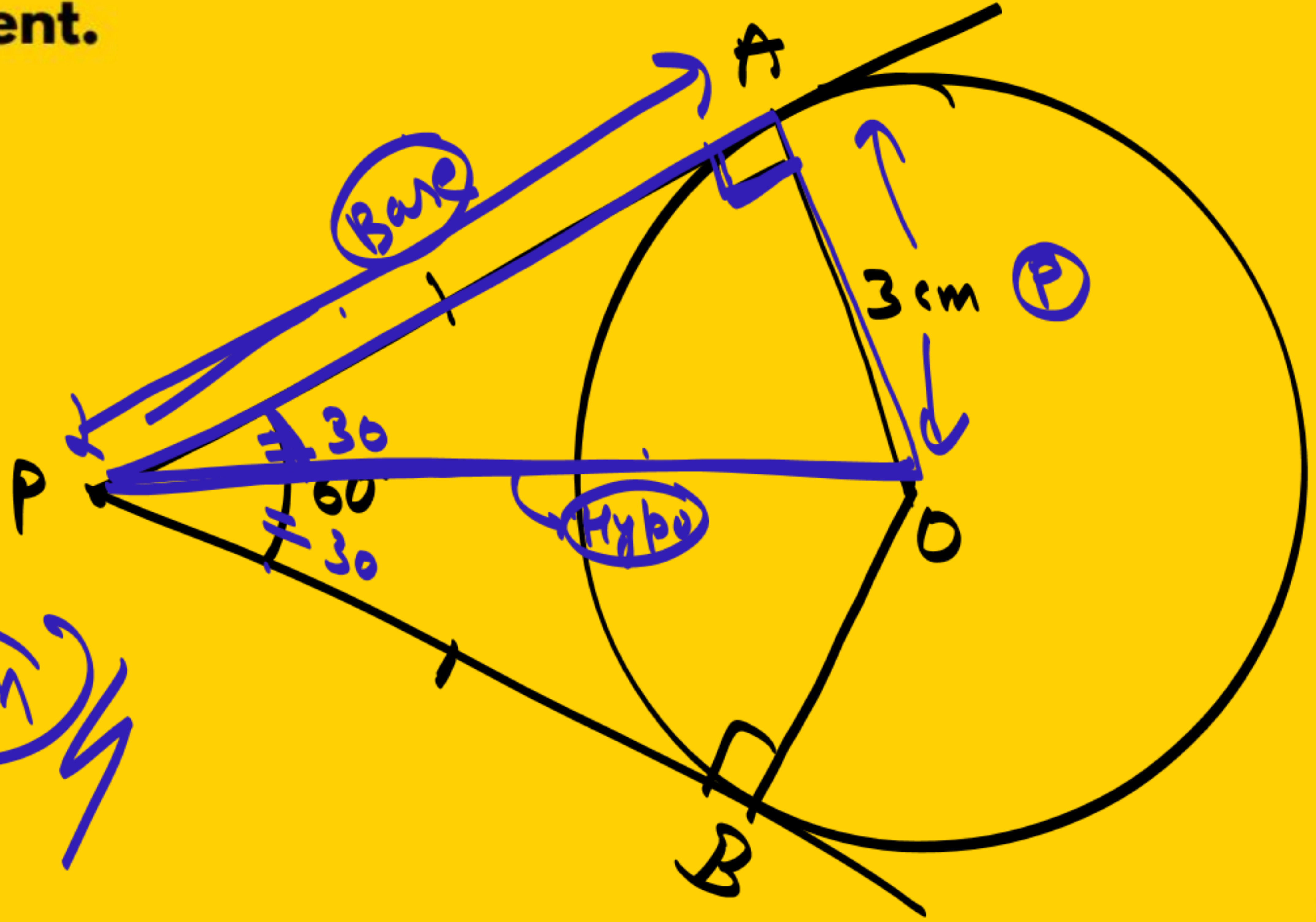
$BC = CD$

$AB = BC$

→ All sides equal.

HP

#LP : If two tangents inclined at 60° are drawn to circle of radius 3 cm , then find length of each tangent.



$\tan 30 = \frac{P}{B}$

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

$AP = 3\sqrt{3}\ cm$

1. Revise Notes
2. Kal M. Imp. 3. Questions.

↳ जितने भी सवाल Exam मे आएगा

THANK YOU Coodies