UDAAN

2026

Circles

MATHS LECTURE-2

BY-RITIK SIR

Topics *to be covered*

A Important Questions (part-1)

Datesheet is out!

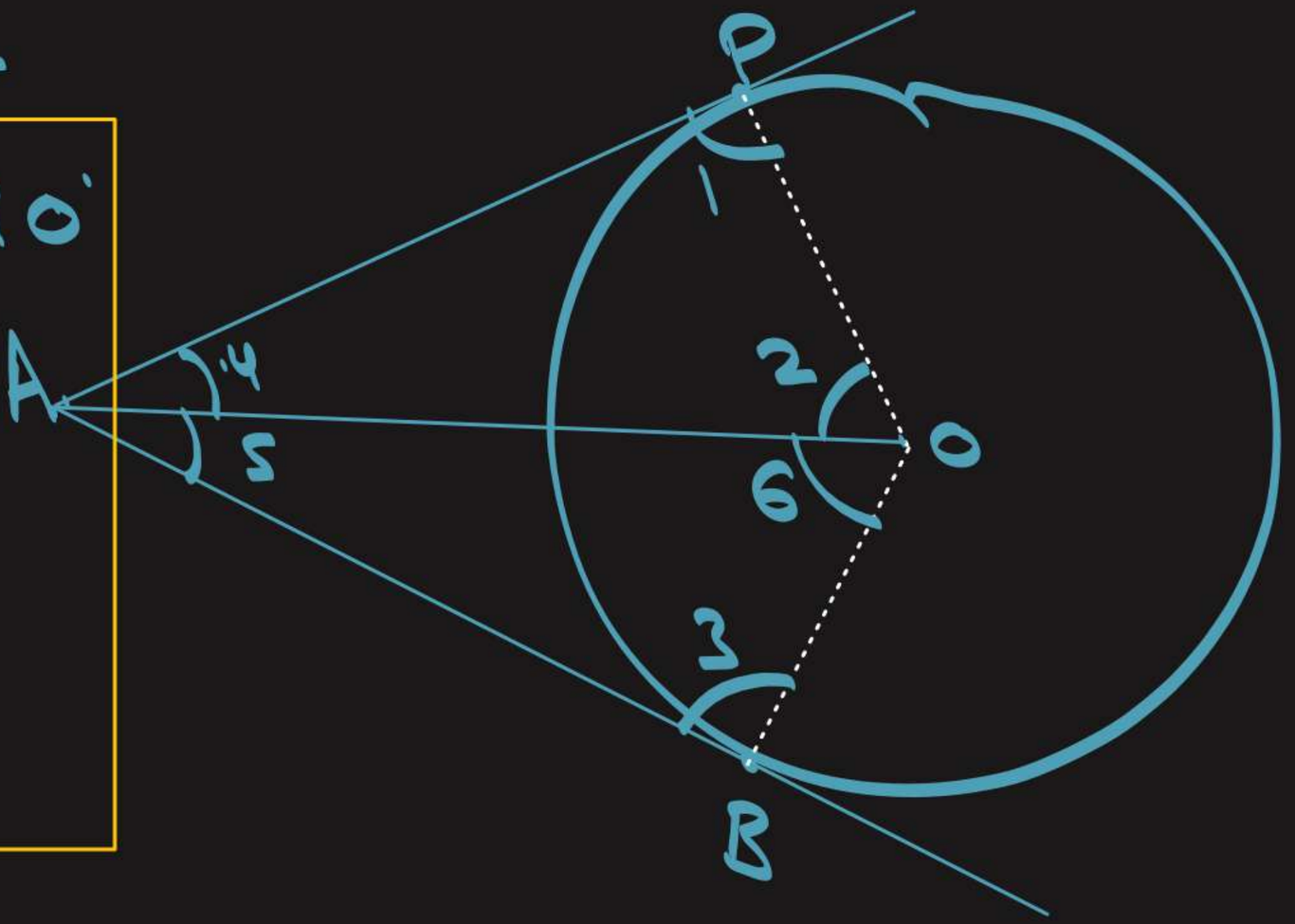
17 → Maths
21 → English
25 → Science
27 → Computer.

2 march → Hindi
7 march → SST

3 Months
Comeback
Tabahi

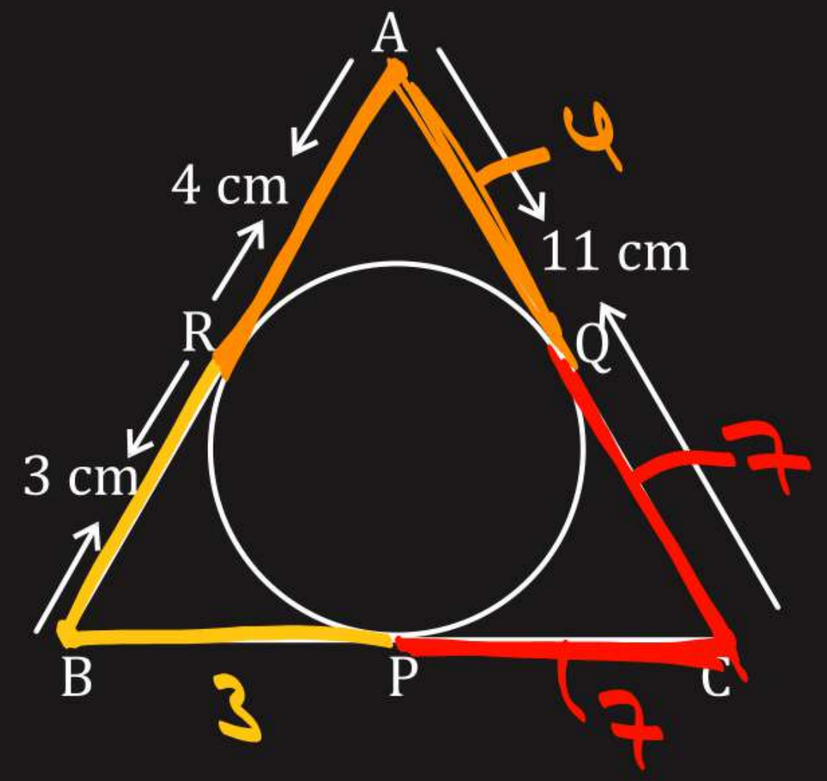
Recap

1. $\angle 1 = \angle 3 = 90^\circ$
2. $\angle 2 = \angle 6$
3. $\angle 4 = \angle 5$
4. $AP = AB$



#Q. In figure, ΔABC is circumscribing a circle. Find the length of BC.

CBSE 2004



#Rithuraj
#Vaibhavi

$BR = BP = 3cm$

$AR = AQ = 4cm$

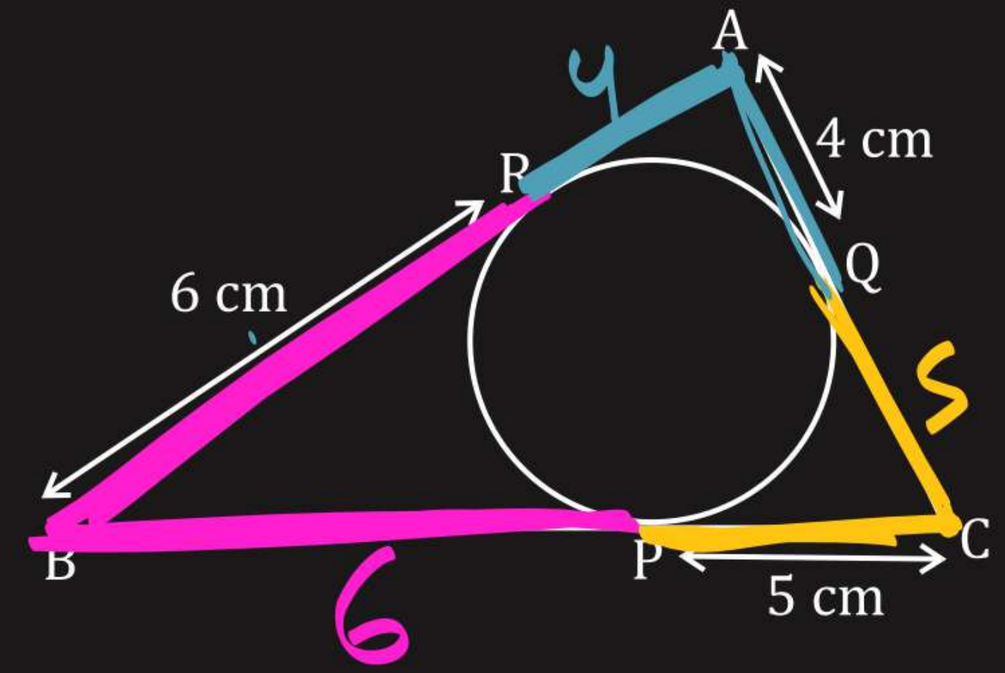
$CQ = CP = 7cm.$

$\therefore BC = BP + PC$

$= \boxed{10cm}$

#Q. In figure, the perimeter of ΔABC is

CBSE 2004



A 30 cm

B 60 cm

C 45 cm

D 15 cm

#Q. In figure below, if AB = AC, prove that BE = EC.

OR

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

CBSE 2008, 12, 14

G: AB = AC

ToP: BE = EC

Proof:

AD = AF
BD = BE
CF = CE
[Tangents from external point]

AB = AC

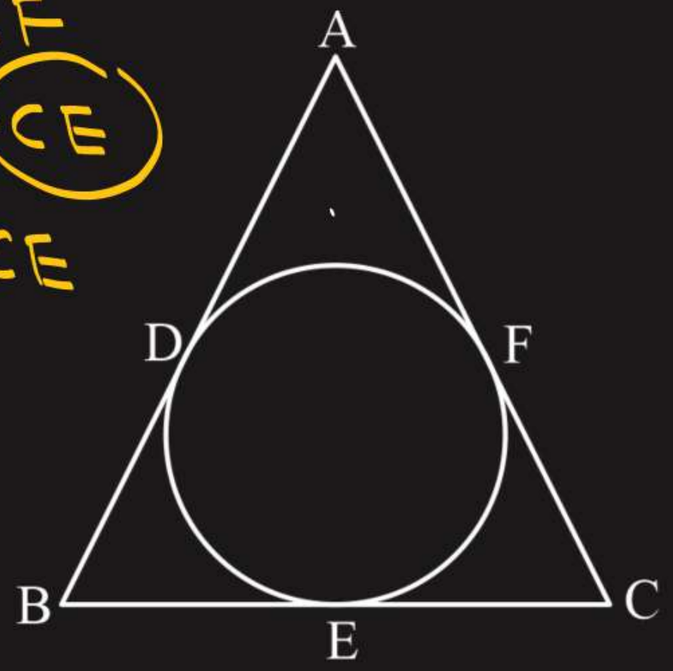
AD + BD = AF + CF

AD + BE = AF + CE

~~AD~~ + BE = ~~AD~~ + CE

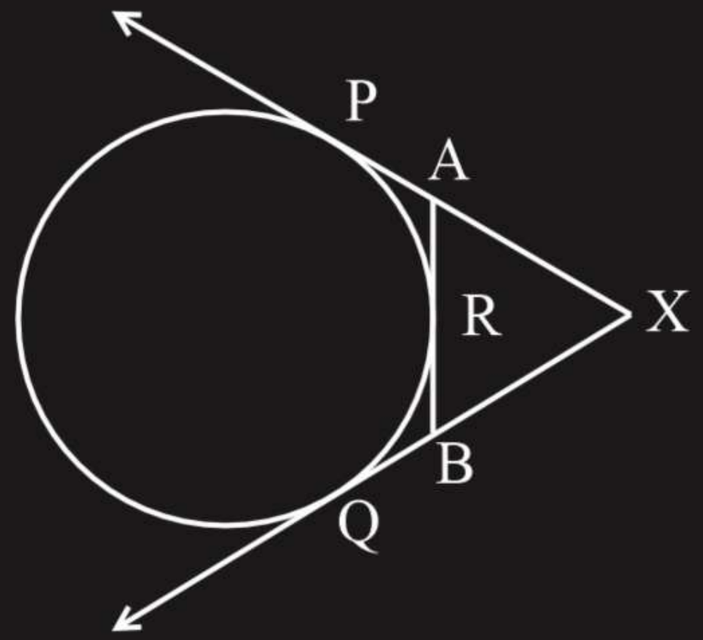
BE = CE

H.P



#Q. In figure below, XP and XQ are tangents from X to the circle with centre O. R is a point on the circle. Prove that, XA + AR = XB + BR.

CBSE 2014



G:

To p: $XA+AR = XB+BR$

PROOF: $XP = XQ$ [Reason.]

$AR = AR$

$BQ = BR$

M.I

$XP = XQ$

$XA+AP = XB+BQ$

$XA+AR = XB+BR$ H.P

M.II

$XA+AR$

$= XA+AP$

$= XP$

$= XQ$

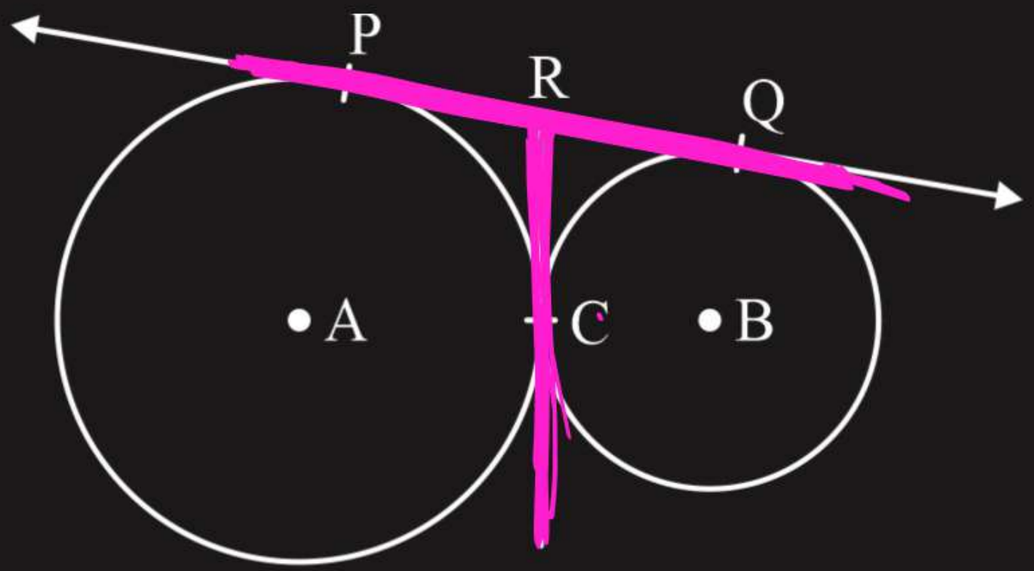
$= XB+BQ$

$= XB+BR$

H.P

#Q. In figure below, two circles touch each other at the point C. Prove that the common tangent to the circles at C, bisects the common tangent at P and Q.

CBSE 2013, 20



RC

PQ

Tob: PR = RQ

(1) RP = RC

(2) RQ = RC [RHS Sim.]

RP = RQ H.P

QT

#Q. A circle touches all four sides of a quadrilateral ABCD. Prove that:

$AB + CD = BC + DA$

CBSE 2008, 09, 12, 13, 14, 15, 17

G:

ToP: $AB+CD = BC+DA$

Proof:

M.I

① $AS = AP$

② $DS = DR$

③ $BQ = BP$

④ $CQ = CR$

R

① + ② + ③ + ④

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

$AD+BC = AB+CD$

M.II

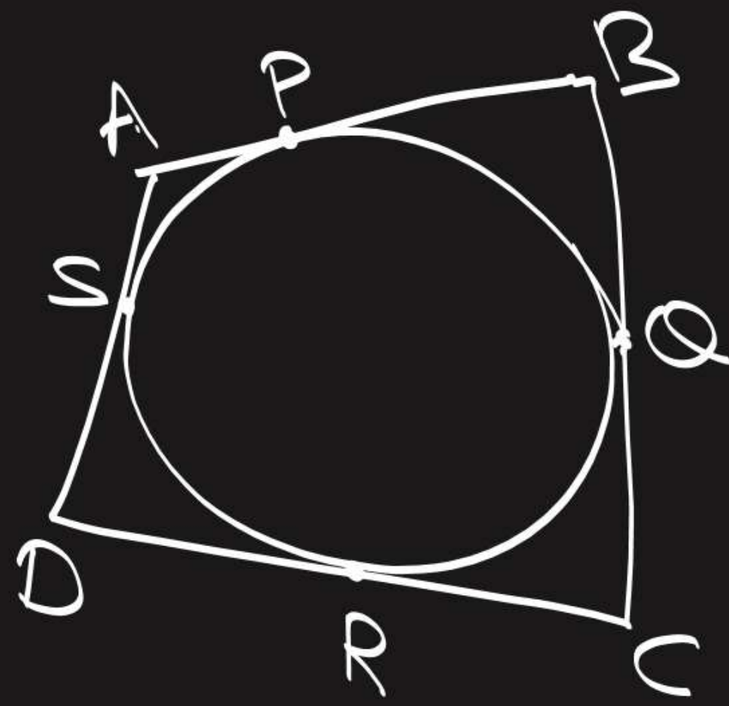
L.H.S

$= AB+CD$

$= AP+BP+CR+DR$

$= AS+BQ+CQ+DS$

$= AD+BC$



#Qr2

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

OR

Prove that a parallelogram circumscribing a circle is a rhombus.

CBSE 2002, 08, 12, 13, 14, 22, 23

G : ABCD is a ||gm.

To p: ABCD is a Rhombus.

$AB + DC = AD + BC$

$AB + AB = BC + BC$

$\Rightarrow AB = AD$

$AB = BC$ ... (1)

Also,

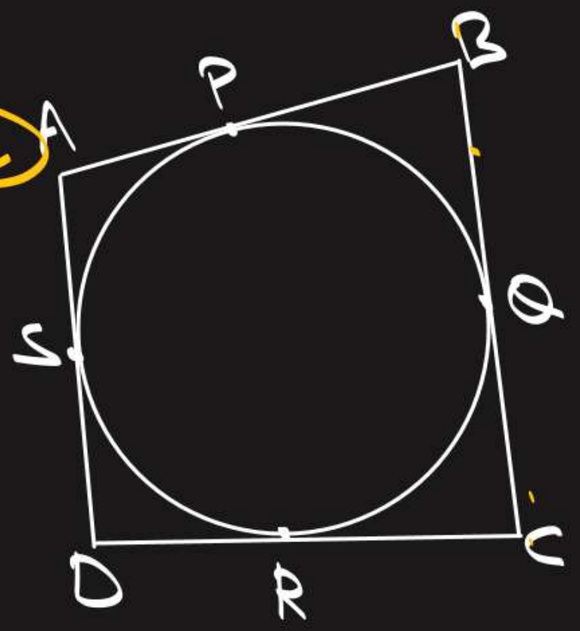
$AB = CD,\ AD = BC$ ... (2)

From (1) and (2)

$AB = BC = CD = AD$

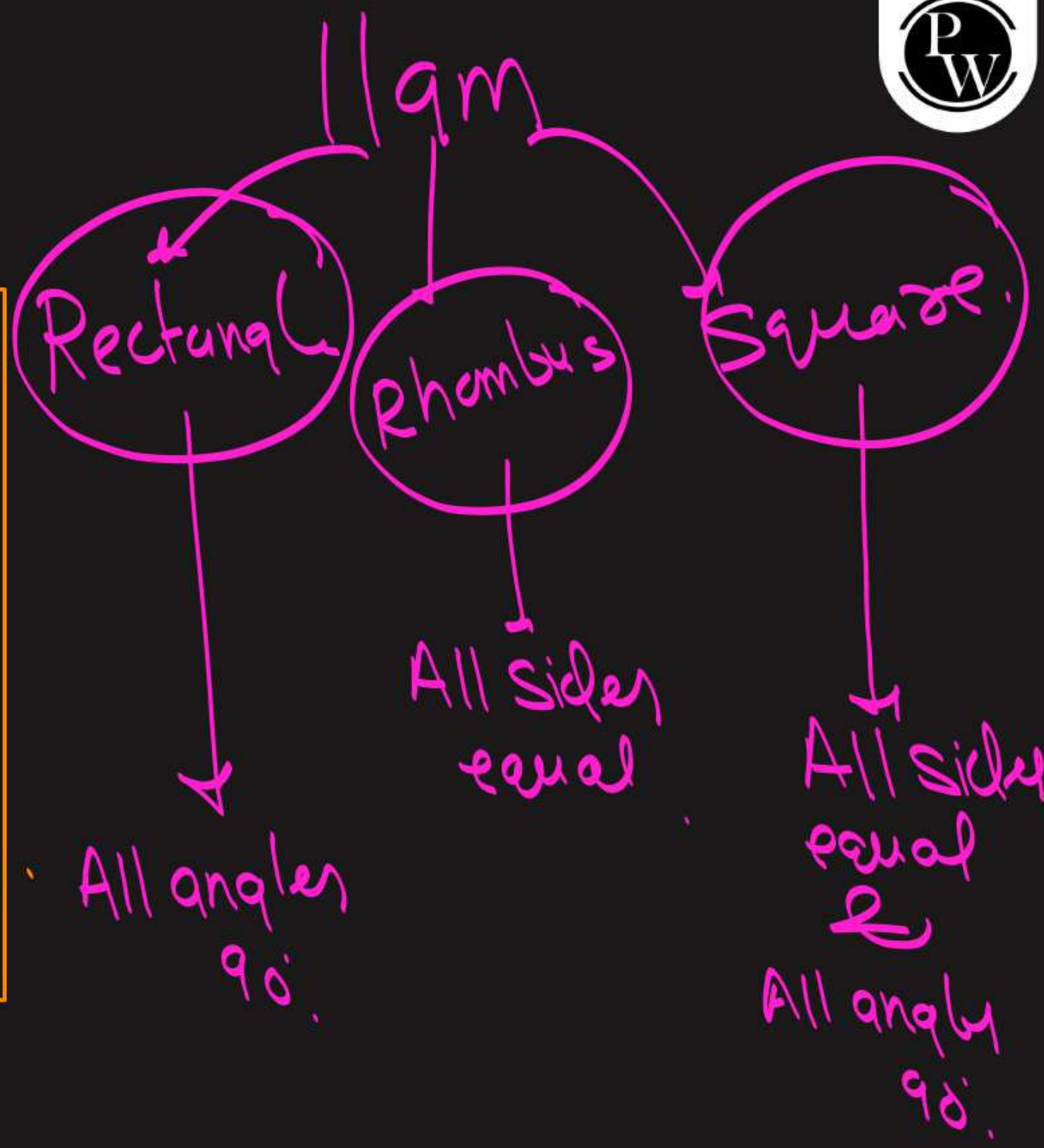
$\Rightarrow$ ABCD is a Rhombus.

H.P



||gm

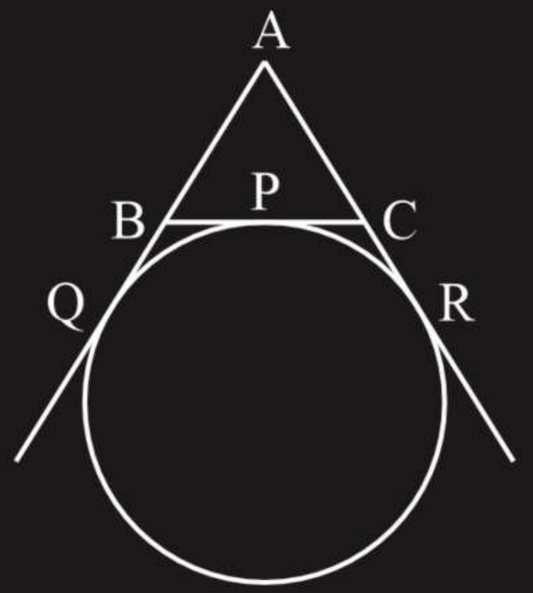
- → opp. sides ||.
- → opp sides equal.
- → opp. angles equal.
- → diagonals bisect each other.



#Q. A circle is touching the side BC of ΔABC at P and touching AB and AC produced at Q and R respectively. Prove that:

$$AQ = \frac{1}{2}(\text{Perimeter of } \Delta ABC)$$

CBSE 2000, 01, 23



G:

ToP: $AQ = \frac{1}{2}(AB+BC+AC)$

Proof: R.H.S

$AQ = AR$
$BP = BQ$
$CP = CR$ [R]

$= \frac{1}{2}[AB+BC+AC]$

$= \frac{1}{2}[AQ-BQ+BP+PC+AR-CR]$

$= \frac{1}{2}[AQ-BP+BP+PC+AR-PC]$

$= \frac{1}{2}[AQ+AR]$

$= \frac{1}{2}[AQ+AQ]$

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

$= AQ$

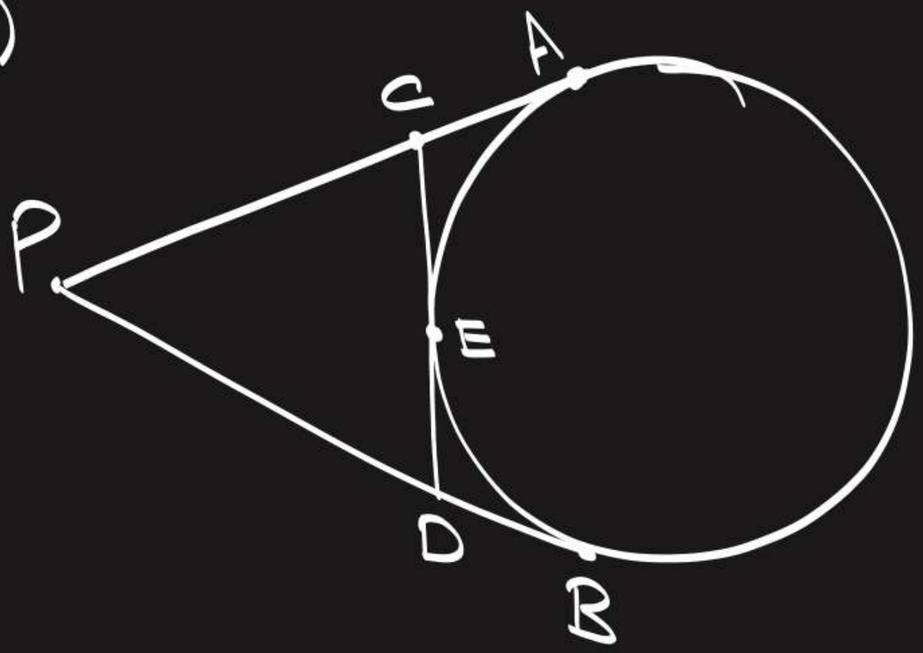
L.H.P

#Q. From an external point P, two tangents PA and PB are drawn to a circle with centre O. At one point E on the circle tangent is drawn which intersects PA and PB at C and D respectively. If PA = 10 cm, find the perimeter of ΔPCD.

$PA = \frac{1}{2}(P \cdot \Delta PCD)$

$10 = \frac{1}{2}(P)$

$20 \text{ cm} = P$



A 10 cm

B 20 cm

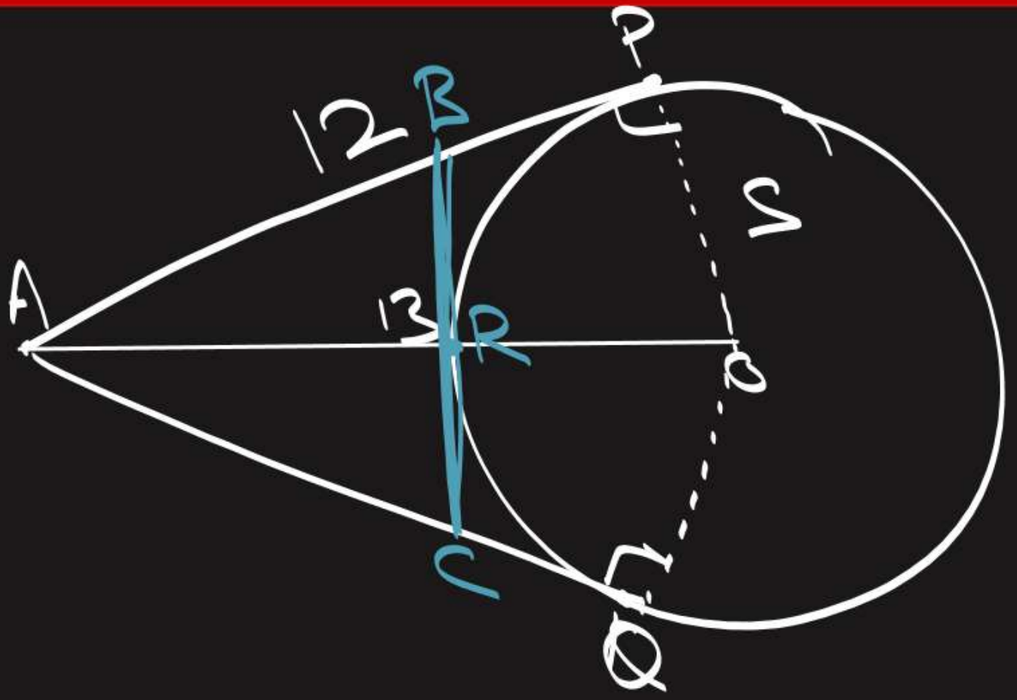
C 30 cm

D 40 cm

#Q. A is a point at a distance 13 cm from the centre O of a circle of radius 5 cm. AP and AQ are the tangents to the circle at P and Q. If a tangent BC is drawn at a point R lying on the minor arc PQ to intersect AP at B and AQ at C, find the perimeter of ΔABC.

$AP = \frac{1}{2}(P)$

$24\ cm = P$



#Q. Prove that the tangents at the extremities of any chord make equal angels with the chord.

CBSE 2017

G:

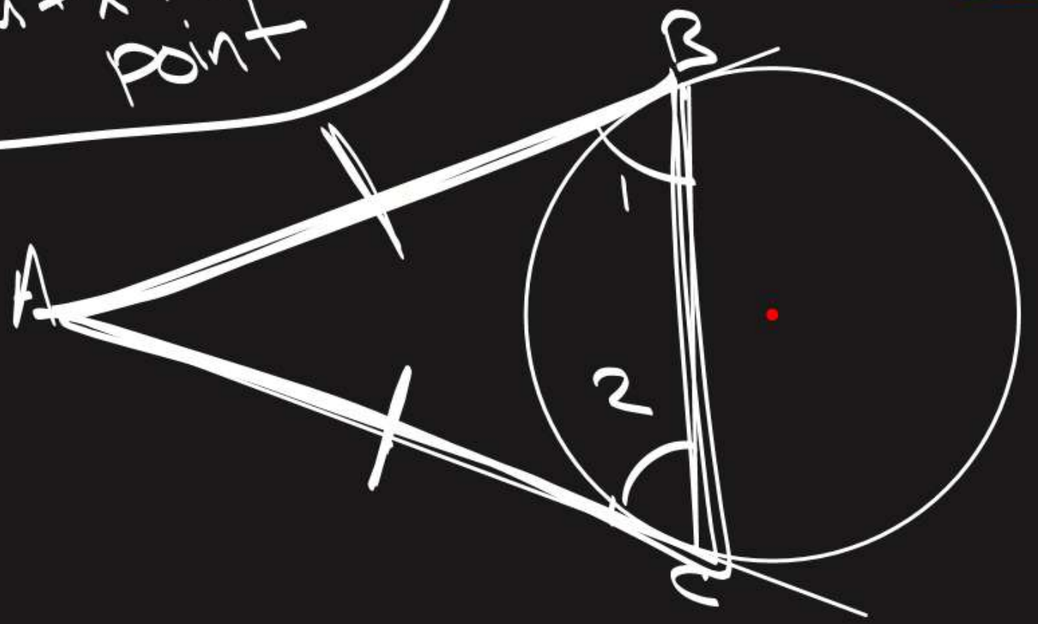
To p: $\angle 1 = \angle 2$

Proof:

$AB = AC$ → tangents from external point

$\angle 2 = \angle 1$

(Angles equal to opp. sides.)



#Q. From an external point P, two tangents PA and PB are drawn to the circle with centre O. Prove that OP is the perpendicular bisector of AB.

CBSE 2015

G:

ToP: $\angle 1 = \angle 2 = 90^\circ$, $AC = BC$ → OP is the ⊥ bisector of BC.

In $\triangle APC$ and $\triangle BPC$.

$\angle 3 = \angle 4$ [Tangents are equally inclined to the line segment joining the centre to that point]

$PA = PB$ [tangents from external point]

$PC = CP$ (Common)

By SAS.

$\triangle PAC \cong \triangle PBC$

By CPCT,

$AC = BC$

$\angle 1 = \angle 2 = x$

$\angle 1 + \angle 2 = 180$ [LP]

$x + x = 180$

$x = 90^\circ$

$\therefore$ OP.....

→ 2 angles → sum = 180°

#Q. Prove that the angle between two tangents drawn from an external point to a circle is supplementary to the angle subtended by the line segments joining the points of contact at the centre.

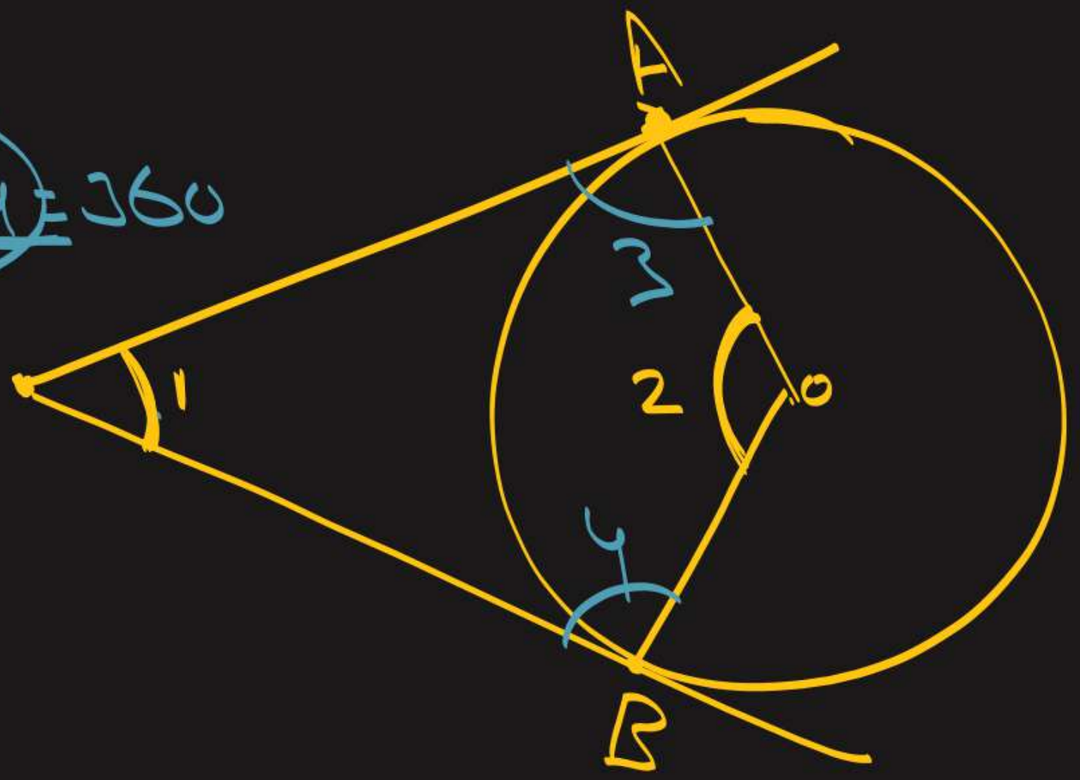
CBSE 2023

Tab: $\angle 1 + \angle 2 = 180°$

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

$\angle 1 + \angle 2 =$

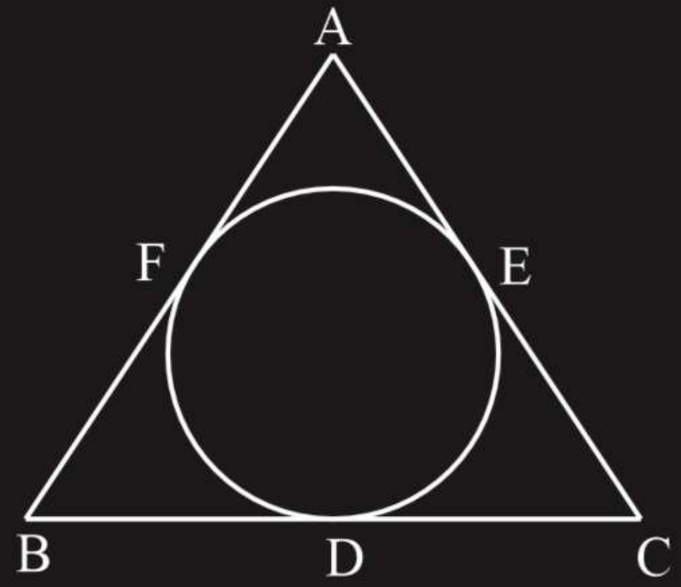
#GBU

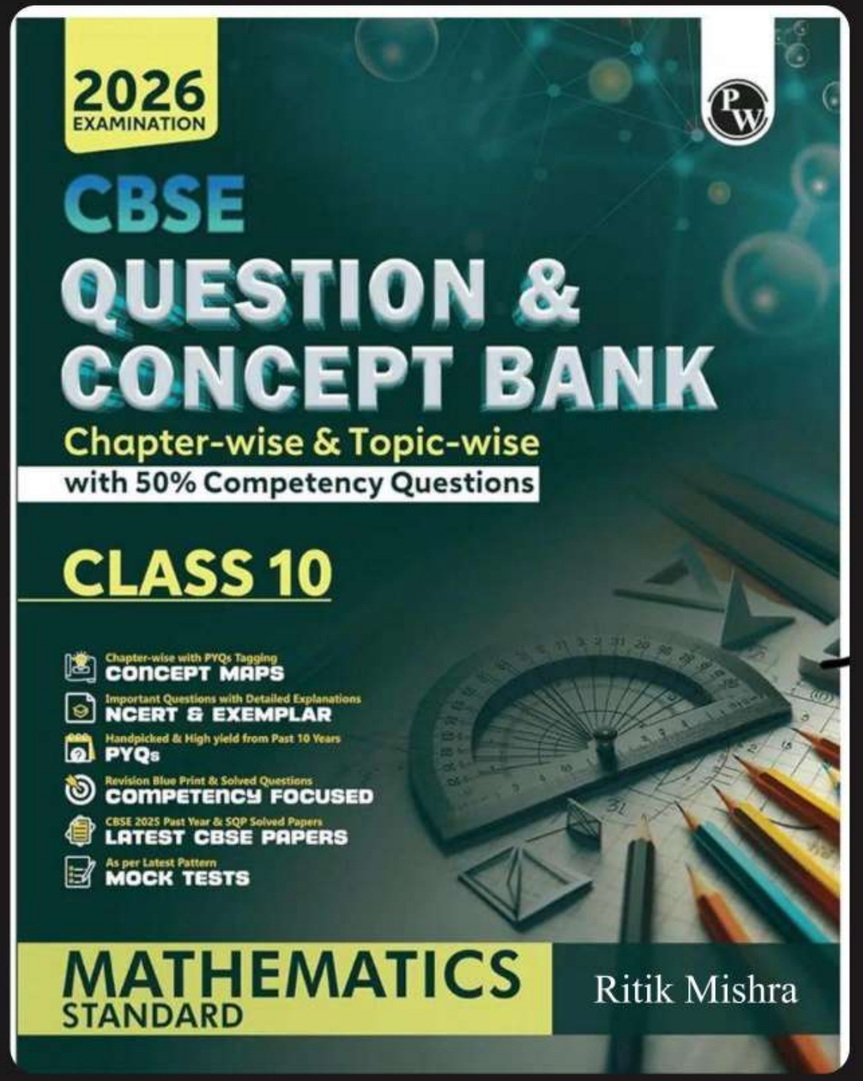


#Q. In figure below, the incircle of ΔABC touches the sides BC, CA and AB at D, E and F respectively. Show that:

$$AF + BD + CE = AE + BF + CD = \frac{1}{2}(\text{Perimeter of } \quad ABC)$$

#GPH



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