CIRCLES AND TANGENTS

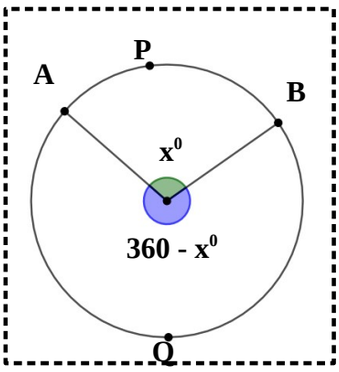
1

Central angle of arc APB + Central angle of arc AQB =360^0

Eg: The central angle of an arc APB is 80^0. What

is the central angle of an arc AQB ?

Central angle of arc AQB = 360 – 80 = 280^0



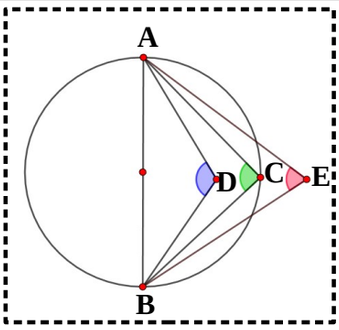
2

The angle in a semicircle is a right angle.

C is a point on the circle , then <ACB =90^0

D is a point inside the circle ,then <ADB > 90^0

E is a point outside the circle , then < AEB < 90^0



3

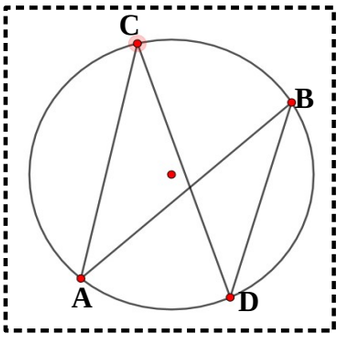
All angles inscribed in an arc are equal .

<ACD = <ABD

<CAB = <CDB

Eg: In figure <BAC= 25^0, Find < B D C .

< B A C = < B D C = 2 5 ^{0} , b e c a u s e t h e y a r e i n t h e s a m e a r c.

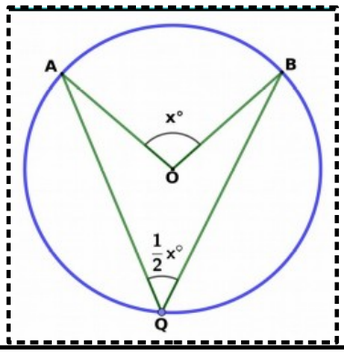


4

The angle made by an arc at its alternate arc is half the central angle of the arc.

Eg : If <AOB = 100^0,find <AQB ?

$< AQB = \frac{1}{2} \times 100 = 50^0$



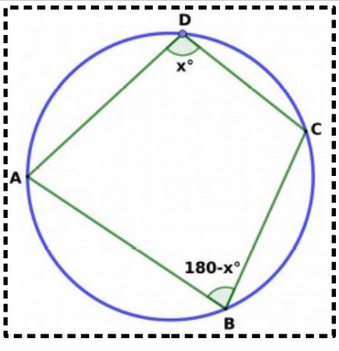
5

The opposite angles of a cyclic quadrilateral are supplimentary .

<B + <D = 180^0 and < A + <C = 180^0

Eg : In a cyclic quadrilateral ABCD, if <A = 75^0 find < C ?

< C = 180 – 75 = 105^0



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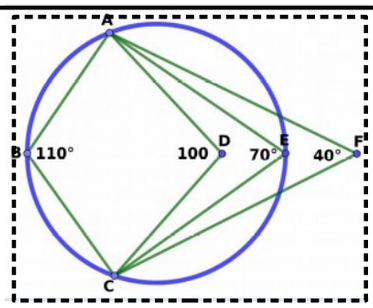
$\angle B + \angle D > 180^0$

$\angle B + \angle E = 180^0$

$\angle B + \angle F < 180^0$



7

The chords AB and CD intersect at P , then

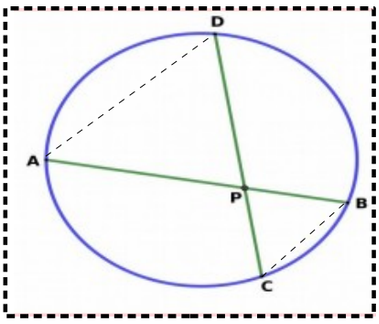
(1) ΔPAD , ΔPCB are similar triangle.

(2) PA × PB = PC × PD

Eg: The chords AB and CD intersect at P , AB = 35cm ,

PA= 20cm, PD = 60, Find PC. PB = 35 – 20 = 15 .

20 x 15 = PC x 60 . PC = 5cm



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The chords AB and CD intersect at a point 'P' outside the circle.

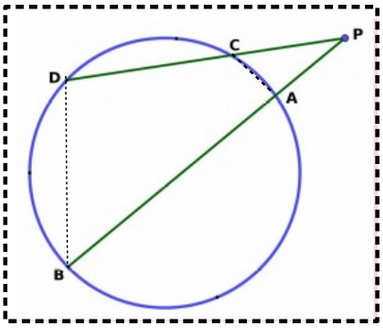
(1) ΔPAC , ΔPBD are similar triangle.

(2) PA × PB = PC × PD

Eg : PA = 8cm , AB = 12cm , PC = 10 ,Find CD.

PA × PB = PC × PD

8 x (8+12) = 10 x PD . PD = 16 , CD = 16–10 = 6cm.



9

AB is the diameter of a semicircle and PC is

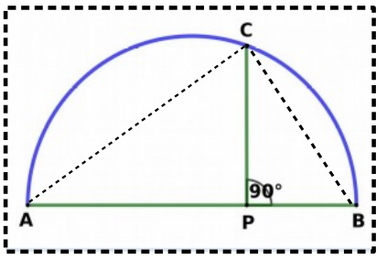
perpendicular to AB,then

(1)ΔPAC,ΔPBC,$\Delta ABC$are similar right triangle.

(2) PA × PB = PC^2

Eg : PA= 18cm , PB = 8cm , Find PC.

18 x 8 = PC^2, PC = $\sqrt{144}$ =12 cm



10

In figure, PA and PB are tangent of the circle with

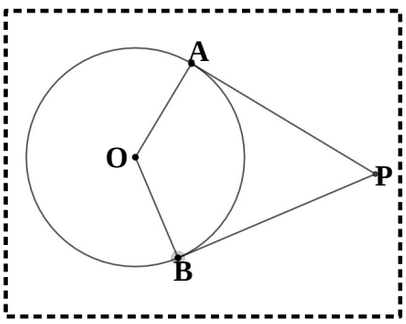
centre 'O'

(1) $\angle PAO = \angle PBO = 90^0$

(2) PA = PB , OA = OB

(3) $\angle AOB + \angle APB = 180^0$

(4) PAOB is a cyclic quadrilateral



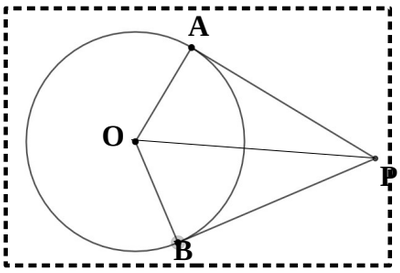
11

In figure, PA and PB are tangent of the circle with centre 'O'

(1) <AOP = <BOP

(2) <APO = < BPO

(3) ΔAOP , ΔBOP are equal right triangle.



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In figure, PA and PB are tangent of the circle with centre 'O'

(1) <PAB = <PBA

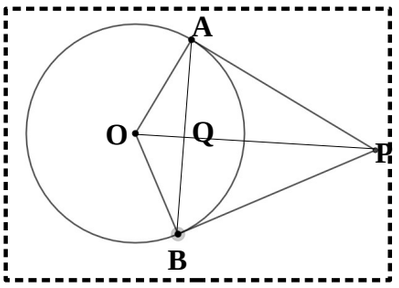
(2) <OAQ = <OBQ

(3) AQ = BQ

(4) ΔAOQ , ΔPAQ , ΔPOA are similar right angled triangle.

(5) ΔBOQ , ΔPBQ , ΔPOB are similar right angled triangle.

(6) OQ × QP = QA^2 , OQ × OP = OA^2



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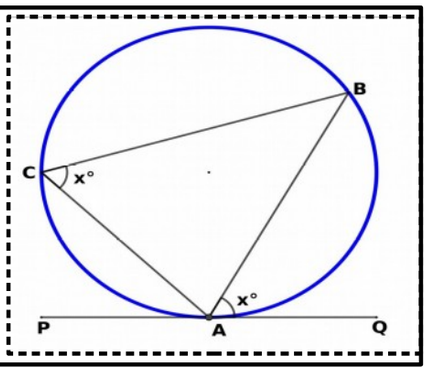
The angle made by a tangent and a chord at a point on a circle is equal to the angle made in the segment on other side of the chord.

(1) <QAB = <ACB

(2) <PAC = <ABC



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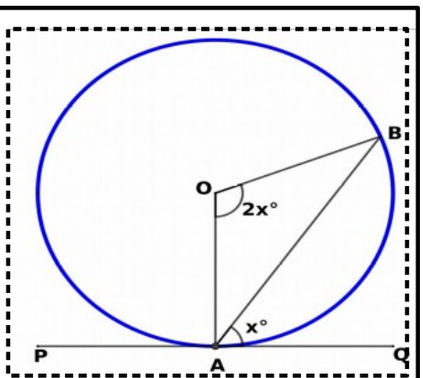
The angle made by a tangent and a chord at a point on a circle is equal to half the central angle of the chord.

$\angle QAB = \frac{1}{2} \angle AOB$



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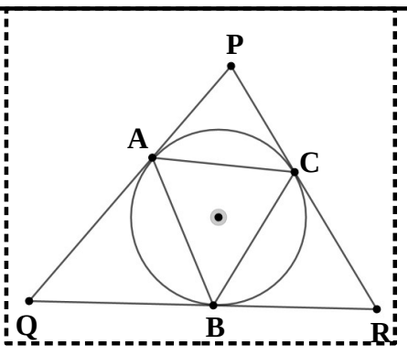
The sides of the large triangle touch the circle at A,B and C respectively,

<QAB = <QBA = <ACB

<PAC = <PCA = <ABC

<RBC = <RCB = <BAC



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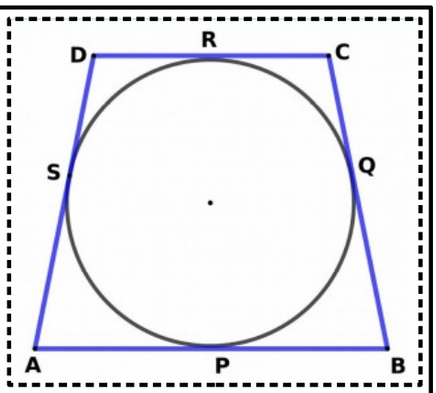
If a quadrilateral is formed by drawing tangents through 4 points of a circle , then the sum of pairs of its opposite sides are equal.

$$AB + CD = AD + BC$$



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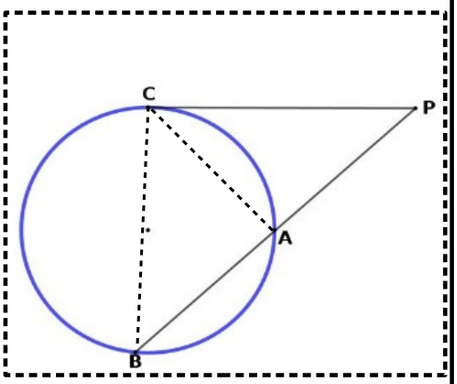
In a circle , the tangent at a point C on the circle and the chord BA extended meet at a point P outside the circle , then

(1) $\Delta PAC, \Delta PBC$ are similar triangle

(2) $PA \times PB = PC^2$



Eg: PA = 4cm , AB = 5cm , Find PC.

$PA \times PB = PC^2$ implies $4 \times (4+5) = PC^2$

$PC = 6cm$