MATHS

BOOKS - NAVBODH MATHS (HINGLISH)

THEOREMS

Similarity

1. Prove that , "If a line parallel to a side of a triangle intersects the remaining sides in two

distinct points then the line divides the sides in the same proportion".

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2. In order to prove, 'The bisector of an angle of a triangle divides the side opposite to the angle in the ratio of the remaining sides.

(i) Draw a neat labelled figure.

(ii) Write 'Given' and 'To prove'.

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3. Theorem 6.6 : The ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding sides.

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Pythagoras Theorem

1. Theorem 6.7 : If a perpendicular is drawn from the vertex of the right angle of a right triangle to the hypotenuse then triangles on both sides of the perpendicular are similar to the whole triangle and to each other.

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2. In order to prove, "In a right angled triangle, the perpendicular segment to the hypotenuse from the opposite vertex, is the geometric mean of the segments into which the hypotenuse is divided."

(i) Draw a neat labelled figure.

(ii) Write 'Given' and 'To prove' from the figure drawn by you.

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3. In order to prove, 'In a right angled triangle, the square of the hypotenuse is equal to the sum of the squares of remaining two sides

(i) Draw a near labelled figure.

(ii) Write 'Given' and 'To Prove' from the figure drawn by you.

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4. In ΔABC, if M is the midpiont of BC and seg AM $\perp$ seg BC, then prove that prove that $AB^2 + AC^2 = 2AM^2 + 2BM^2$.

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Circle

1. Theorem:A line drawn through the end point of a radius and perpendicular to it is a tangent to the circle.

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2. Theorem: The length of two tangents drawn from an external point to a circle are equal.

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3. If two circles touch each other (internally or externally); the point of contact lies on the line through the centres.

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4. If two arcs of a circle (or of congruent circles) are congruent, then corresponding chords are equal.

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5. If two chords of a congruent circle are equal; then their corresponding arcs.

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6. Inscribed Angle Theorem

The measure of an inscribed angle is half of the measure of the arc intercepted by it.

Given : In a circle with centre O, $\angle BAC$ is inscribed in an arc BAC. $\angle BAC$ intercepts are BXC of the circle.

To prove : $m\angle BAC = \frac{1}{2}$ m (arc BXC) .

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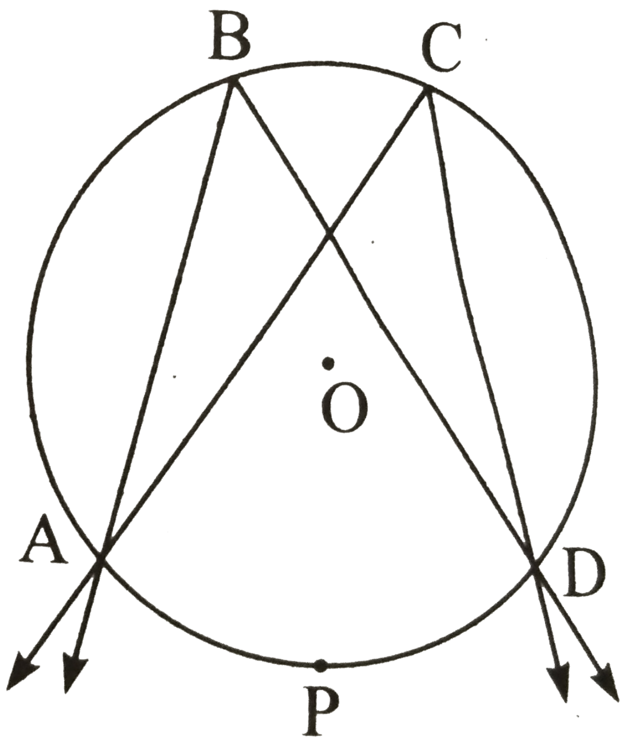
7. Corollaries of inscribed angle theorem :

Angle inscribed in the same arc arc contruent

Given : (1) A circle with centre O

(2) $\angle ABD$ and $\angle ACD$ are inscribed in arc ABC and intercepts arc APD.

To prove : $\angle ABD \cong \angle ACD$



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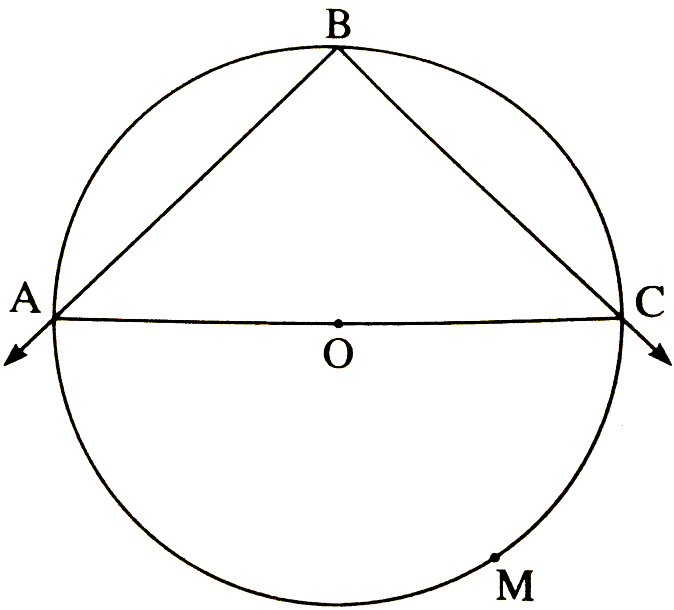
8. In the figure, O is the centre of the circle. Seg AC is the diameter $\angle ABC$ is inscribed in arc ABC and intercepts arc AMC then prove $\angle ABC = 90^\circ$



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9. The sum of either pair of opposite angles of a cyclic quadrilateral is 180^0 OR The opposite angles of a cyclic quadrilateral are supplementary.

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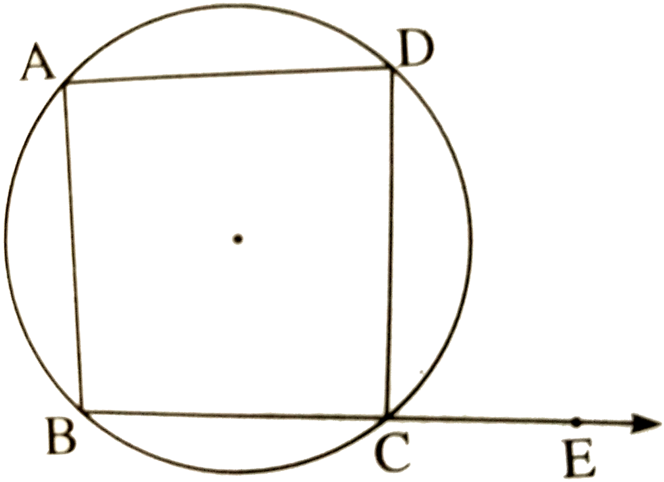
10. Given :

□ ABCD is cyclic. $\angle DCE$ is an exterior angle of □ ABCD.

To Prove : $\angle DCE = \angle BAD$

Complete the proof by filling the boxes.



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11. If a line segment joining two points subtends equal angles at two other points lying on the sae side of the line segment; the four points are concyclic.

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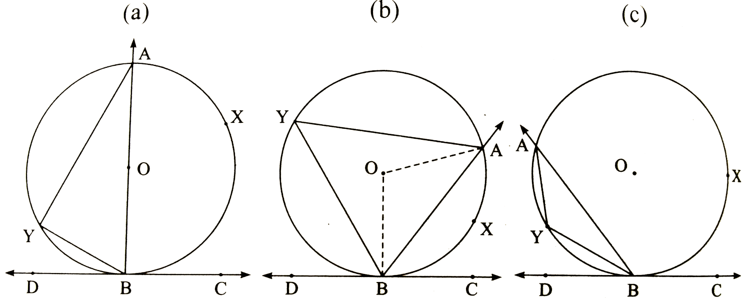
12. Theorem of angle between tangent and secant

If an angle has its vertex on the circle, its one side touches the circle and the other intersects the circle in one more point, then the measure of the angle is half the measure of its intercepted arc .



Given : Let O be the centre of the circle. Line DBC is tangent to the circle at point B. Seg BA is a chord of the circle. Point X of the circle is on C side of line BA and point Y of the circle is on D side of line BA.

To prove : m $\angle ABC = \frac{1}{2} m(arc AXB)$.

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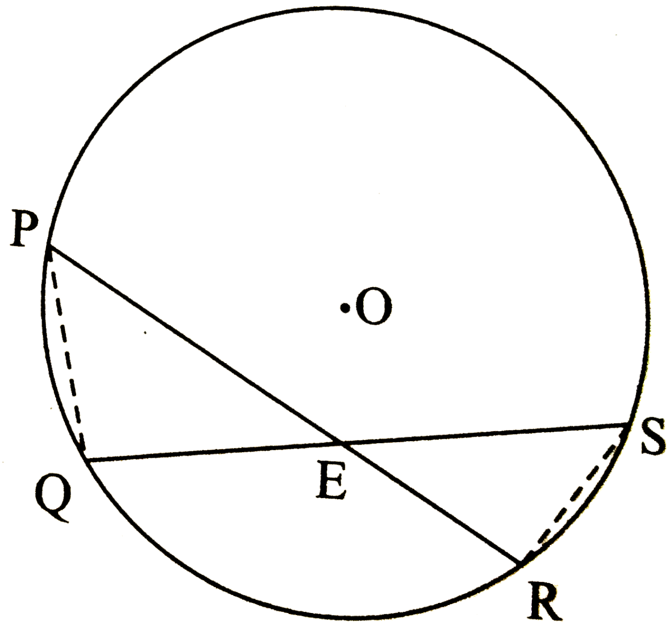
13. Theorem of internal division of chords.

Suppose two chords of a circle intersect each other in the interior of the circle, then the product of the lengths of the two segments of one chord is equal to the product of the lengths of the two segments of the other chord.



Given : (1) A circle with centre O .

(2) chords PR and QS intersect at point E inside the circle.

To prove : PE $\times$ ER = QE xx ES $Construction$

:` Draw seg PQ and seg RS

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14. Theorem of external division of chords.

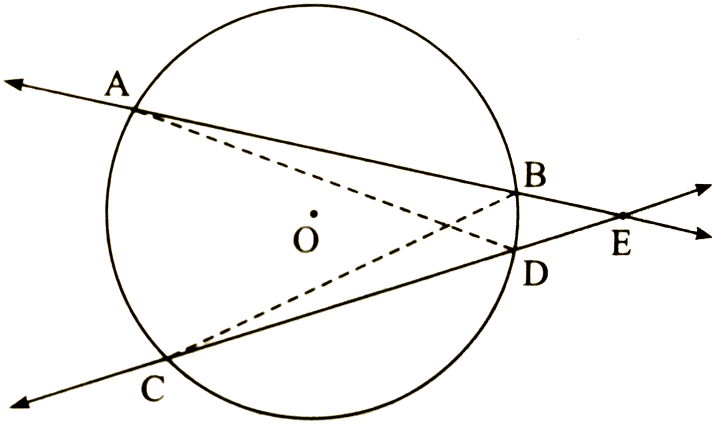
If secants containing chords AB and CD of a circle intersect outside the circle in point E, then $AE \times EB = CE \times ED$

Given : (1) A circle with centre O

(2) Secants AB and CD intersect at point E outside the circle.

To prove : $AE \times EB = CE \times DE$

Construction : Draw seg AD and seg BC



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15. Tangent Secant Theorem

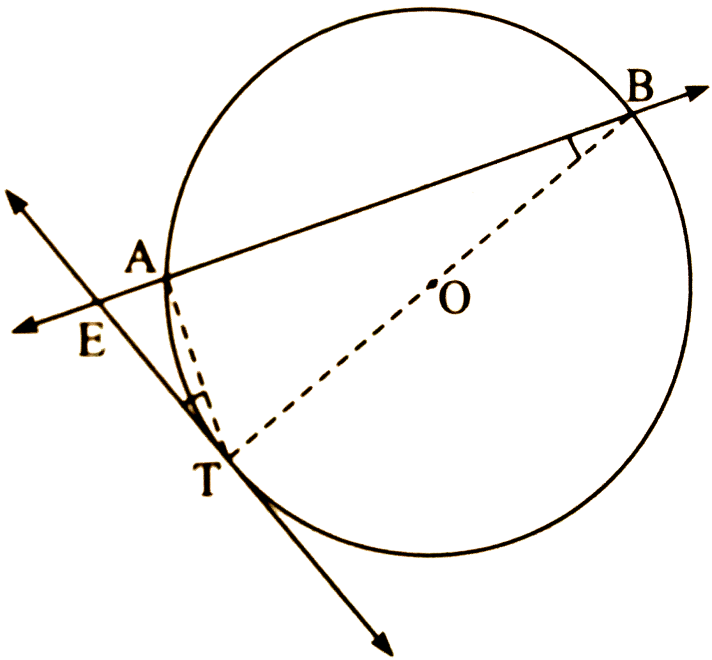
Point E is in the exterior of a circle. A secant through E intersects the circle at points A and B, and a tangent through E touches the circle at point T, then $EA \times EB = ET^2$.

Given : (1) A circle with centre O

(2) Tangent ET touches the circle at pointT

(3) Secant EAB intersects the circle at points A and B .

To prove : $EA \times EB = ET^2$



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