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CLASS – 9

MATHEMATICS

Chapter – 7

Triangles

Part – 11

Some more Criteria for Congruence of Triangles

Vikas Saini

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OVERVIEW

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1. All-equality of triangles
2. Criteria for congruence of triangles
3. Some properties of a triangle
4. Some more criteria for congruence of triangles

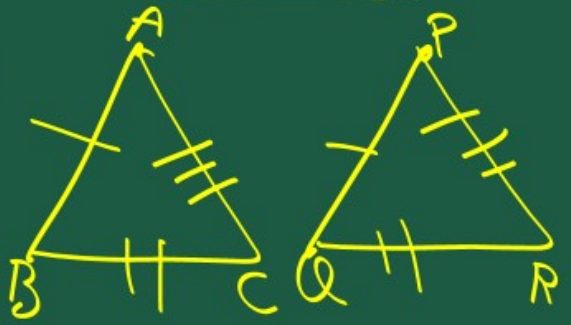
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4. SSS CONGRUENCE RULE

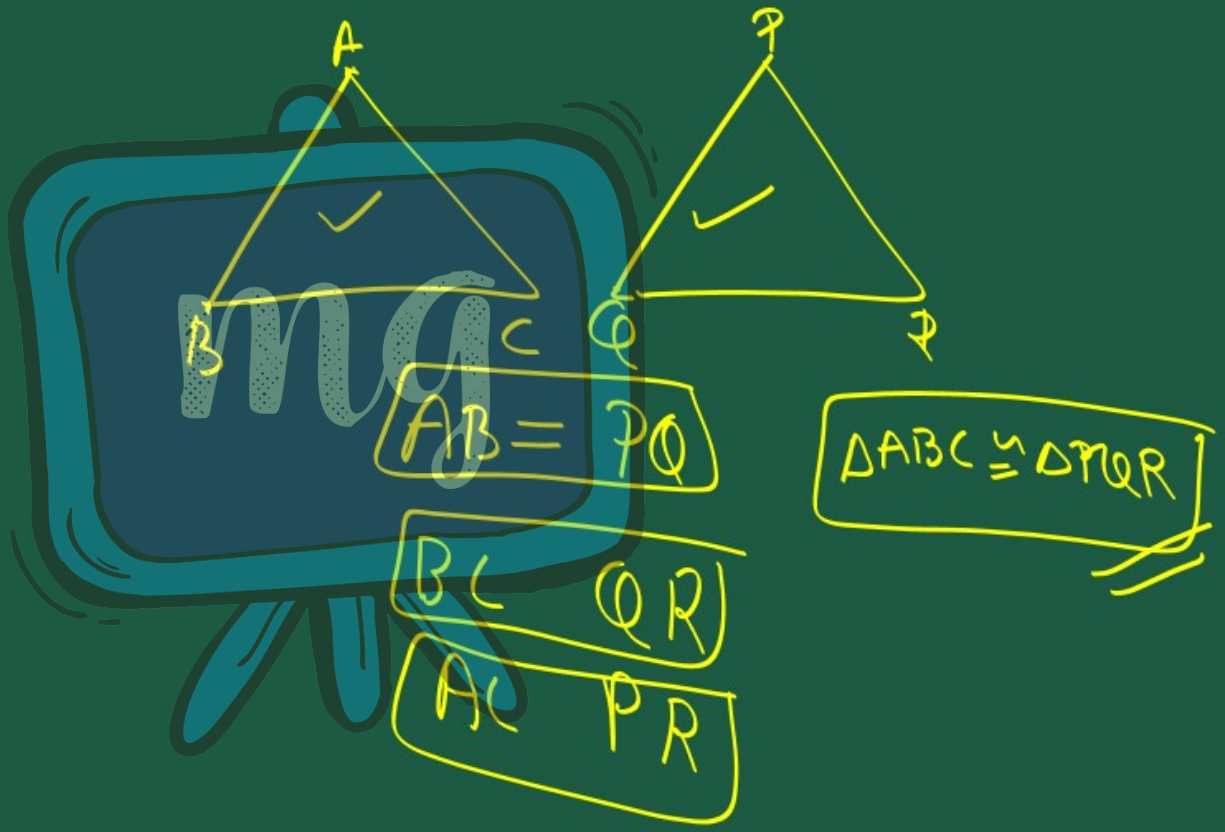
Theorem - 7.4

If three sides of one triangle are equal to the three sides of another triangle, then the two triangles are congruent.



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5. RHS CONGRUENCE RULE

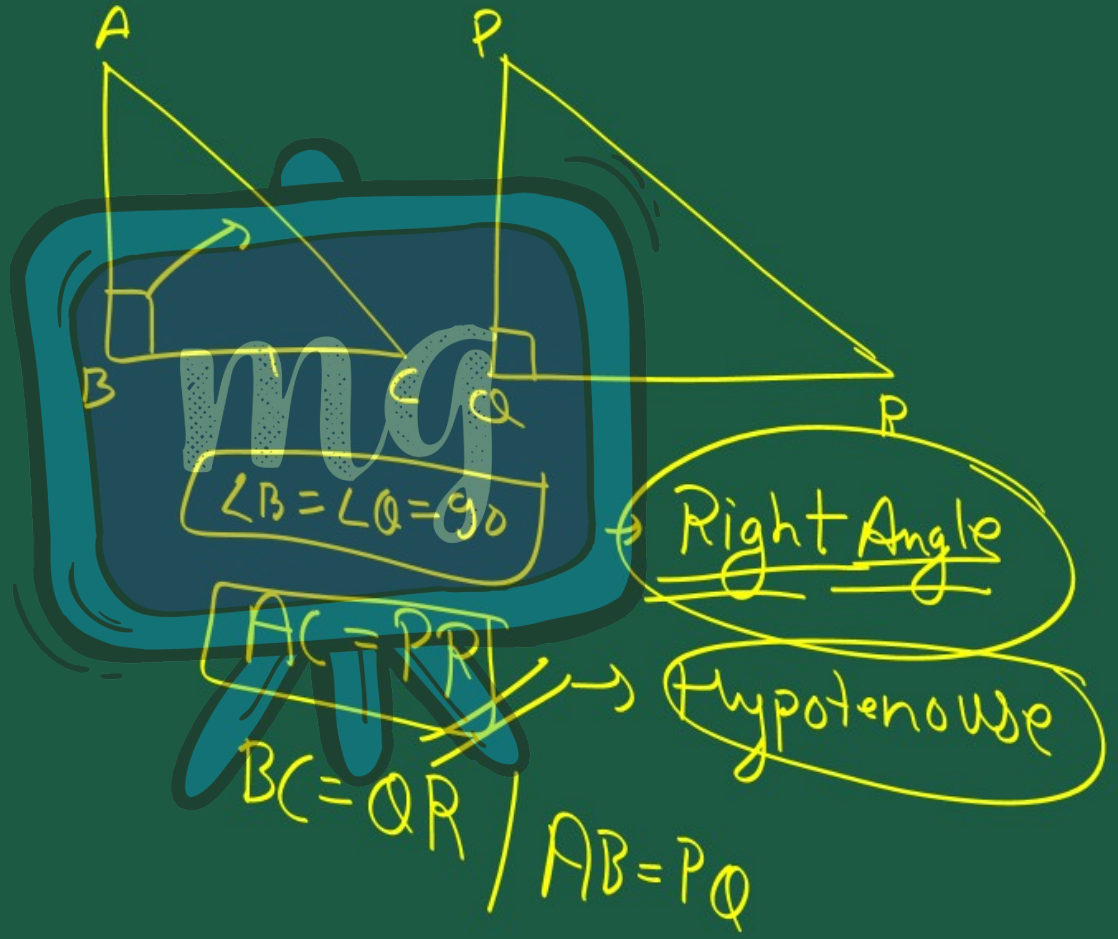
Theorem - 7.5

If in two right triangles the hypotenuse and one side of one triangle are equal to the Hypotenuse and one side of the other triangle, then the two triangles are congruent.

Right
Hypotenuse
Side

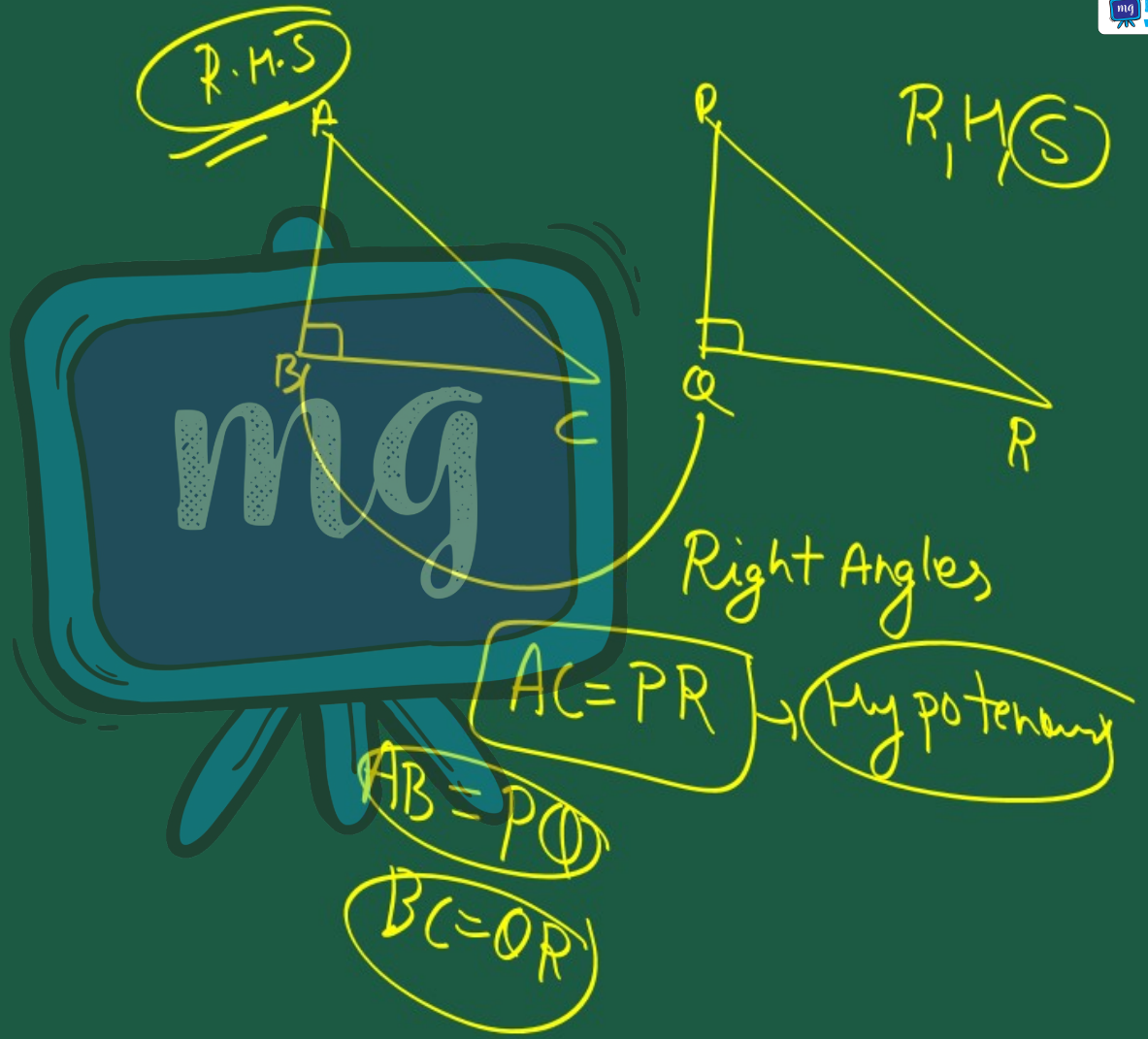
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Example : 7

AB is a line-segment. P and Q are points on opposite sides of AB such that each of them is equidistant from the points A and B (see Figure). Show that the line PQ is the perpendicular bisector of AB.

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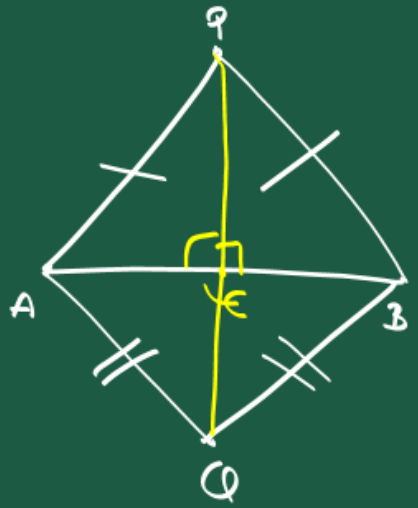
Given: AB is line Segment.

& two points P & Q are palam opp. to AB.

S.t AP = BP

AQ = BQ

& PQ intersect AB at C.



To prove: PQ is perpendicular bisector of AB

AC = BC

∠PCA = ∠PCB = 90°.

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Soln :→ In $\triangle PAQ$ & $\triangle PBQ$

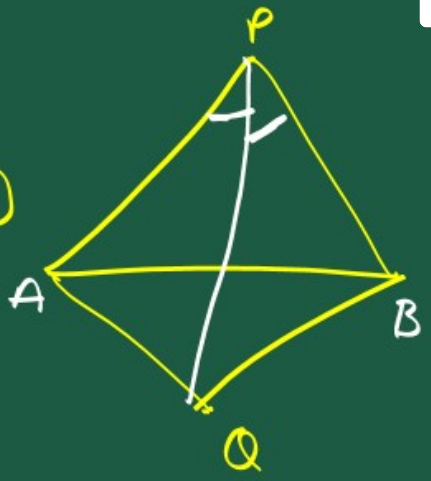
$AP = BP$ [Given]

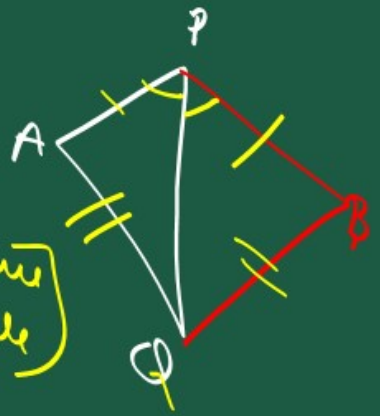
$AQ = BQ$ [Given]

$PQ = PQ$ [Given]

$\triangle PAQ \cong \triangle PBQ$ [By SSS Congruence Rule]

$\angle APQ = \angle BPQ$ [C.P.C.T]





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In $\triangle APC$ & $\triangle BPC$

$AP = BP$ [Given]

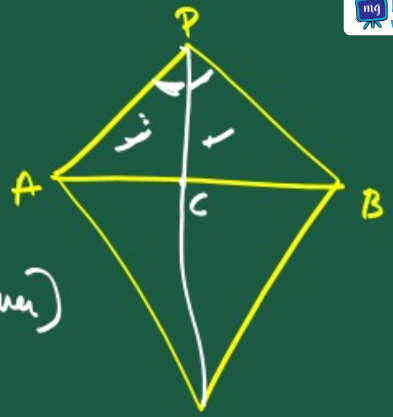
$\angle APC = \angle BPC$ [Proved above]

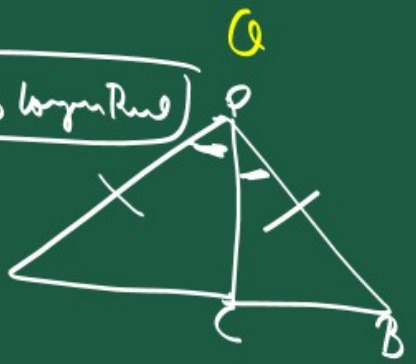
$PC = PC$ [Common]

$\triangle APC \cong \triangle BPC$ [By SAS Congruence]

$AC = BC$ [C.P.C.T]

$\angle ACP = \angle BCP$



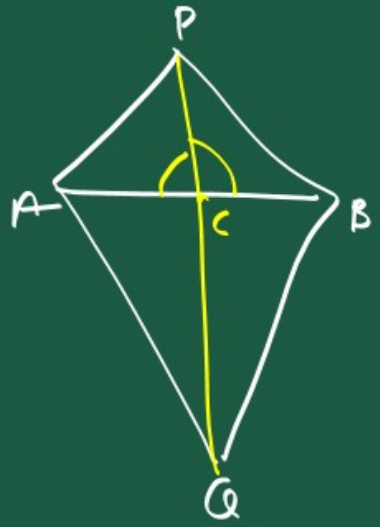


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$AC = BC$

$\angle ACP = \angle BCP$



Since AB is Straight line

PQ intersect AB at C.

$\angle ACP + \angle BCP = 180^\circ$ [linear pair]

$\angle ACP + \angle ACP = 180^\circ$

$2\angle ACP = 180^\circ$

$\angle ACP = \frac{180^\circ}{2} = 90^\circ$

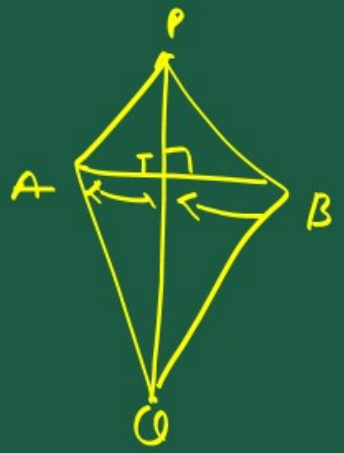
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$\angle ACP = \angle BCP = 90^\circ$

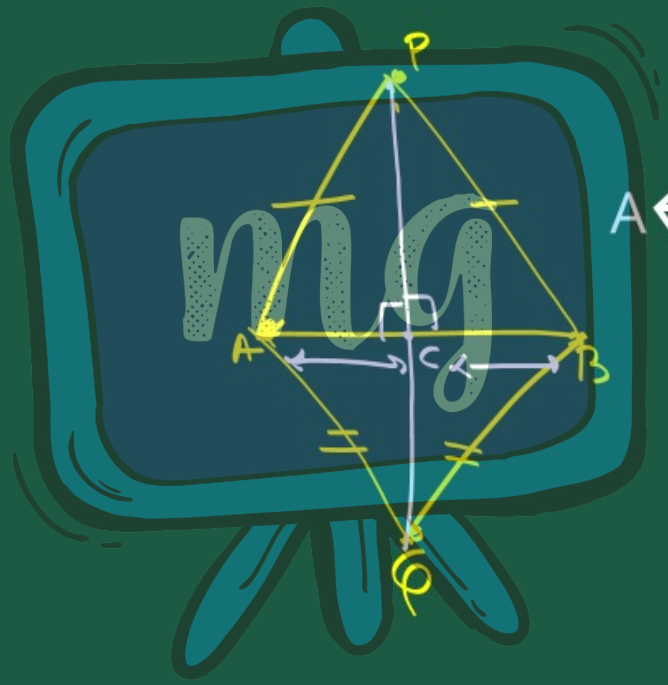
$AC = BC$

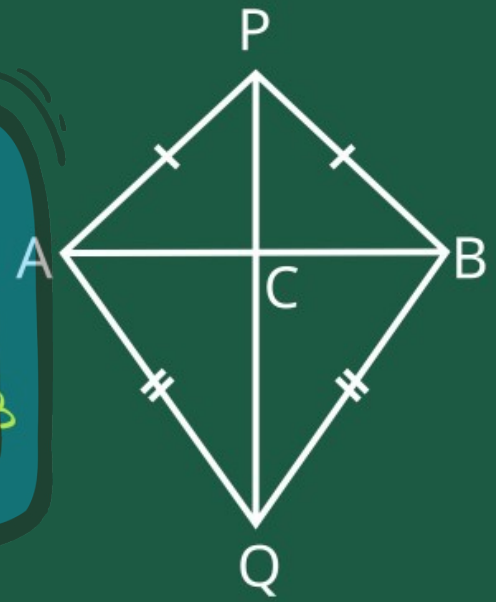
PQ is perpendicular of AB.



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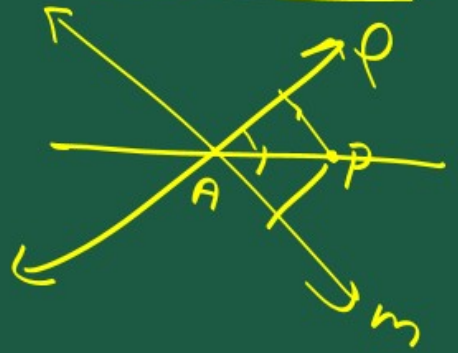


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Example : 8

P is a point equidistant from two lines l and m intersecting at point A (see Figure). Show that the line AP bisects the angle between them.

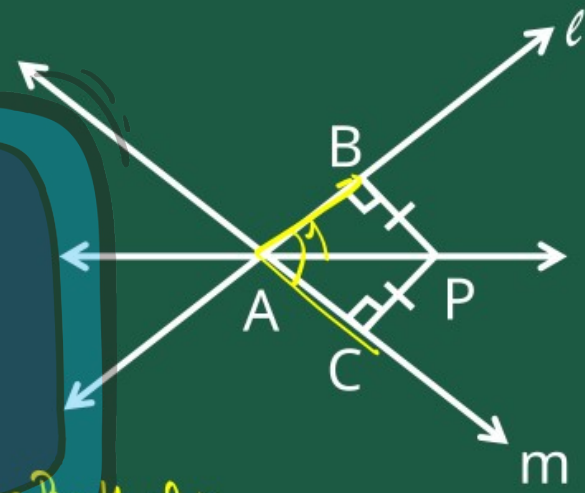


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Given: line l & m intersect at point A.

$\triangle$ P is point equidistant from Both of them



To prove: AP bisects $\angle A$. [$\angle BAP = \angle CAP$]

Construction: draw $PB \perp l$ at B
$PC \perp m$ at C
S.t $PB = PC$

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Sol :→

In $\triangle PBA$ & $\triangle PCA$

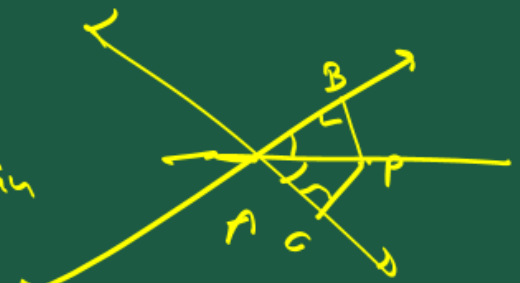
$\angle B = \angle C = 90°$ [Given]

$AP = AP$ [Given]

$PB = PC$ [Given]

$\triangle PBA \cong \triangle PCA$ [R.H.S Rule]

$\angle PAB = \angle PAC$ [C.P.C.T]

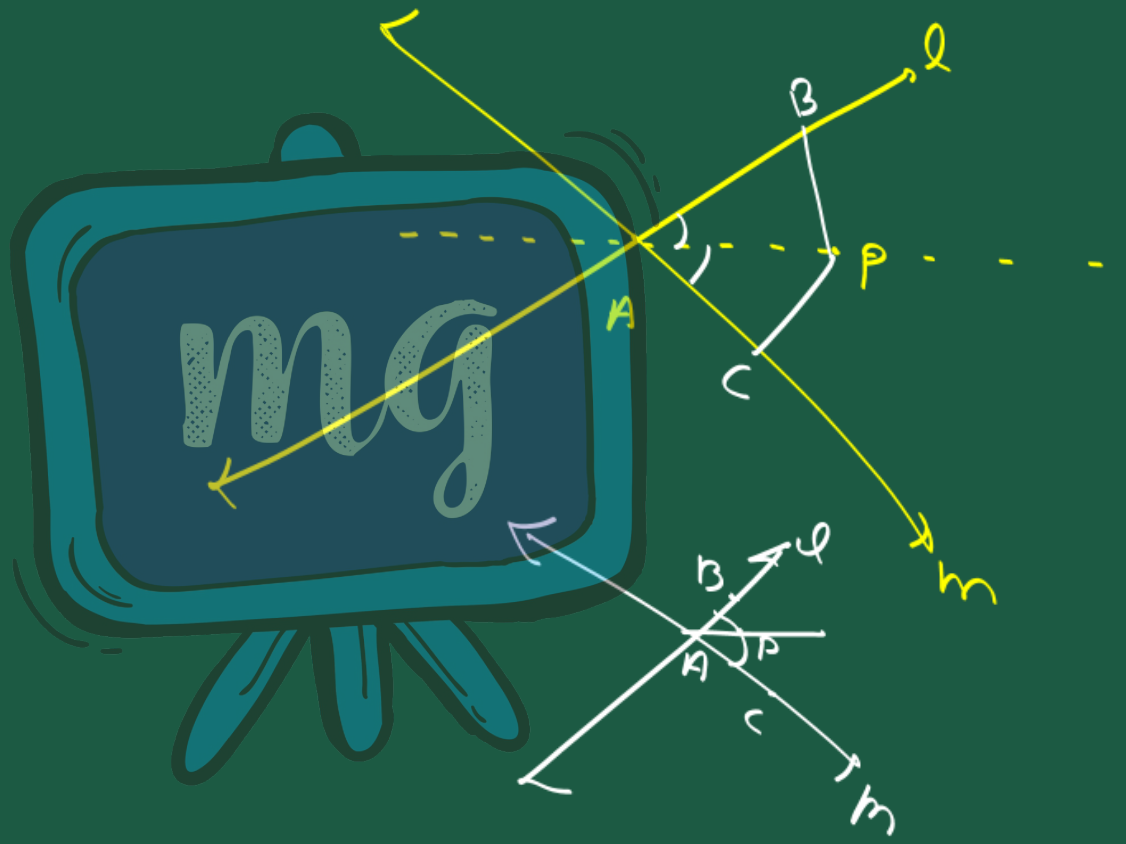






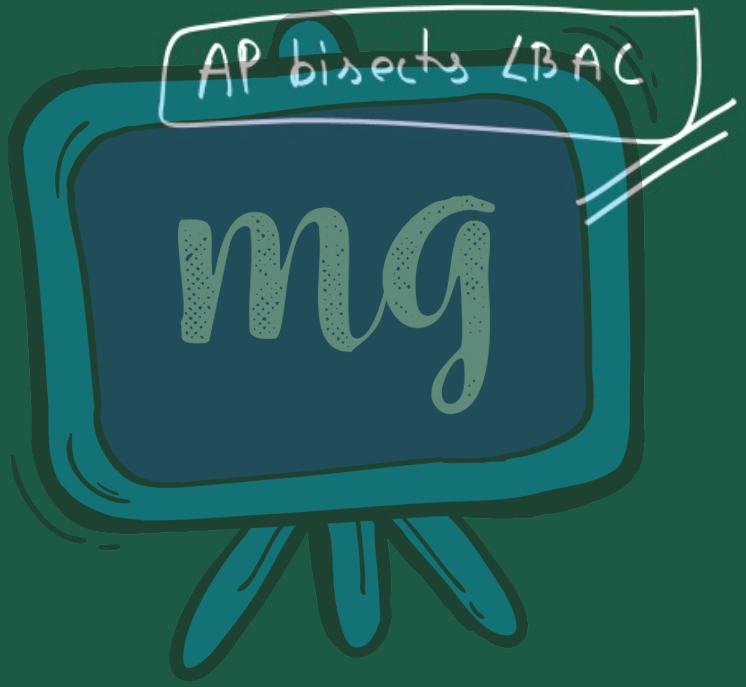
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LEARNING OUTCOMES

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1. SSS Congruence Rule
2. RHS Congruence Rule

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ASSESSMENT

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1 For two triangles, if the three sides of one triangle are equal to the three sides of the other triangle, then the congruence rule is:

A SAS rule

B SSS rule

C RHS rule

D None of these

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ASSESSMENT

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2 If in ΔABC and ΔPQR, AB = QR, BC = PR and CA = PQ, then

A $\Delta PQR \cong \Delta BCA$

B $\Delta BAC \cong \Delta RPQ$

C $\Delta CBA \cong \Delta PRQ$

D $\Delta ABC \cong \Delta PQR$