PERIOD 9

MATHEMATICS

CHAPTER NUMBER :~ 7
CHAPTER NAME :~ TRIANGLES

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PREVIOUS KNOWLEDGE TEST

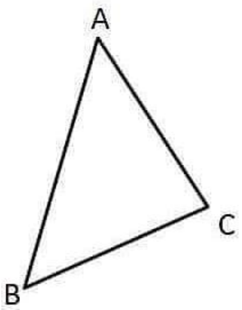
1.In a triangle ABC, D is the mid-point of side AC such that BD = 1/2 AC. Show that ∠ABC is a right angle.

LEARNING OUTCOME:~

1.Students will be able to learn about the inequalities in a triangle.

2. Students will be able to solve application sums on inequalities of triangles.

If two sides of a triangle are unequal, the angle opposite to larger side is larger (or greater).

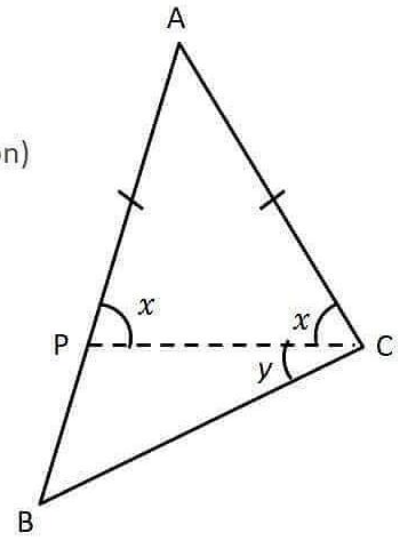


Given :- ΔABC such that AB > AC .

To Prove :- ∠C > ∠B .

Construction:- Take a point P on AB such that AP = AC and join CP.

Let ∠APC = x° & ∠BCP = y°



Proof:- Since AP = AC (By construction)

By **Theorem 7.2**: In triangle, angles opposite to equal sides are equal

⇒ ∠ACP = ∠APC

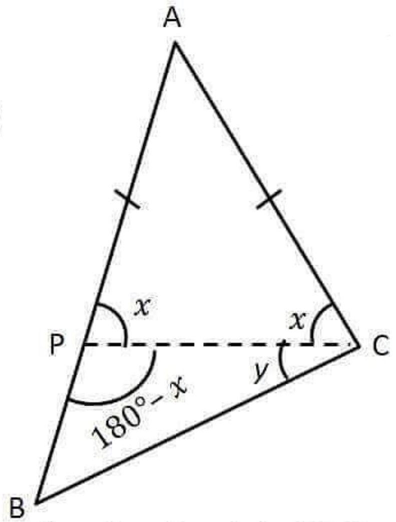
⇒ ∠ACP = x ...(1)

On line AB,

$\angle APC + \angle BPC = 180°$ (Linear pair)

$\angle BPC = 180° - \angle APC$

$\angle BPC = 180° - x$ ....(2)



In Δ PBC,

$\angle BPC + \angle PBC + \angle PCB = 180°$ (Sum of angles of a triangle is 180°)

$180° - x + \angle PBC + y = 180°$

$\angle PBC = 180° - 180° + x - y$

$\angle PBC = x - y$

$\angle B = x - y$

Now,

$\angle C = \angle BPC + \angle PCA = x + y$

Thus,

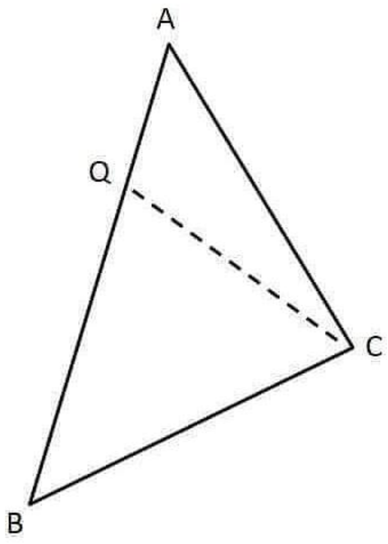
$\angle C > \angle B$

Similarly,

If AB > BC ,

Take point Q on AB such that BQ = BC,

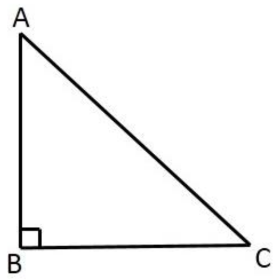
then we can prove $\angle C > \angle A$



Hence Proved.

Ex7.4, 1

Show that in a right angled triangle, the hypotenuse is the longest side.



Given:

Δ ABC is a right-angled triangle

, right-angled at B i.e. ∠ B = 90°

To prove: AC is the longest side of Δ ABC

Proof:

In ΔABC,

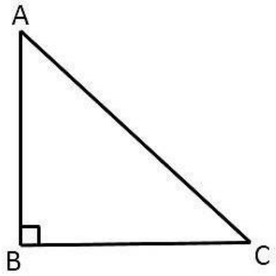
∠A + ∠B + ∠C = 180° *(Angle sum property of triangle)*

∠A + 90° + ∠C = 180° *(Given ∠B = 90°)*

∠A + ∠C = 180° – 90°

∠A + ∠C = 90°

Angle can't be 0 or negative



Hence,

$\angle A < 90°$

$\angle A < \angle B$

$BC < AC$ *(Side opposite to the greater angle is longer)*

Also,

$\angle C < 90°$

$\angle C < \angle B$

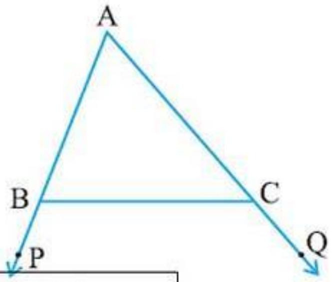
$AB < AC$ *(Side opposite to the greater angle is longer)*

$\therefore$ AC is the longest side in Δ ABC

Hence proved

Ex7.4, 2 (Method 1)

In the given figure sides AB and AC of ΔABC are extended to points P and Q respectively. Also, ∠PBC < ∠QCB. Show that AC > AB.



∠PBC is the external angle of Δ ABC

So, ∠ PBC = ∠ A + ∠ ACB *(Exterior angle is sum of interior opposite angles)* ...(1)

Similarly,

∠QCB is the external angle of Δ ABC

So, ∠ QCB = ∠ A + ∠ ABC *(Exterior angle is sum of interior opposite angles)* ...(2)

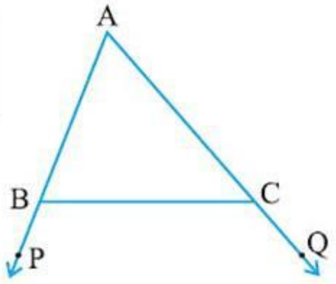
Now,

∠PBC < ∠QCB

∠ A + ∠ ACB < ∠ A + ∠ ABC (From (1)&(2))

∠ ACB < ∠ ABC

AB < AC (Side opposite to the greater angle is longer)

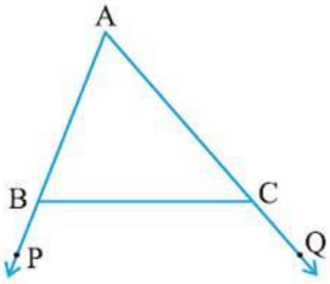


Thus, AC > AB

Hence proved.

Ex7.4, 2 (Method 2)

In the given figure sides AB and AC of ΔABC are extended to points P and Q respectively. Also, $\angle PBC < \angle QCB$. Show that $AC > AB$.



Since AP is a line

$\angle ABC + \angle PBC = 180°$ *(Linear Pair)*

$\angle ABC = 180° - \angle PBC$ ...(1)

Similarly,

Since AQ is a line

$\angle ACB + \angle QCB = 180°$ *(Linear Pair)*

$\angle ACB = 180° - \angle QCB$ ...(2)

Now,

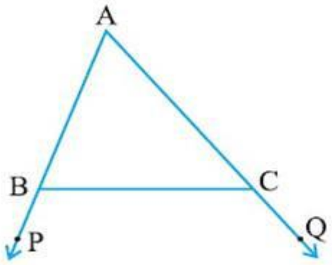
$\angle PBC < \angle QCB$

$-\angle PBC > -\angle QCB$ *(Sign changes on multiplying negative number)*

$180° - \angle PBC > 180° - \angle QCB$

$\angle ABC > \angle ACB$

$AC > AB$ (Side opposite to the greater angle is longer)



Thus, $AC > AB$

Hence proved.

HOMEWORK ASSIGNMENT

Exercise 7.4

Question number 1,2

AHA

. ABCD is quadrilateral such that AB = AD and CB = CD. Prove that AC is the perpendicular bisector of BD.

THANKING YOU
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