ODM EDUCATIONAL GROUP
Changing your Tomorrow

PERIOD 10

MATHEMATICS

CHAPTER NUMBER :~ 7
CHAPTER NAME :~ TRIANGLES

PREVIOUS KNOWLEDGE TEST

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

LEARNING OUTCOME:~

1.Students will be able to learn Theorems 7.7 and 7.8 .

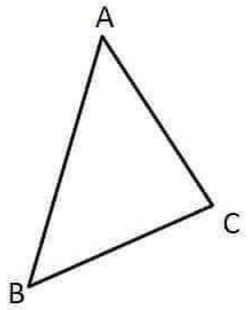
2. Students will be able to solve applications based on Theorems 7.7 and 7.8 .

Theorem 7.7 :-

In any triangle, the side opposite to the larger (greater) angle is longer.

Theorem 7.7 :-

In any triangle, the side opposite to the larger (greater) angle is longer.



Given :- ΔABC such that $\angle C > \angle B$.

To Prove :- $AB > AC$.

Proof:-

Let us assume $AC > AB$,

then $\angle B > \angle C$

By **Theorem 7.6**: If two sides of a triangle are unequal, the angle opposite to longer side is larger

Which **contradicts** our assumptions

Hence $AB > AC$

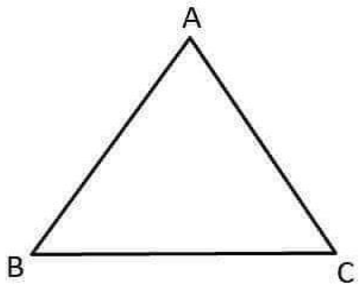
Hence Proved.

Theorem 7.8 :-

The sum of any two sides of a triangle is greater than the third side.

Theorem 7.8 :-

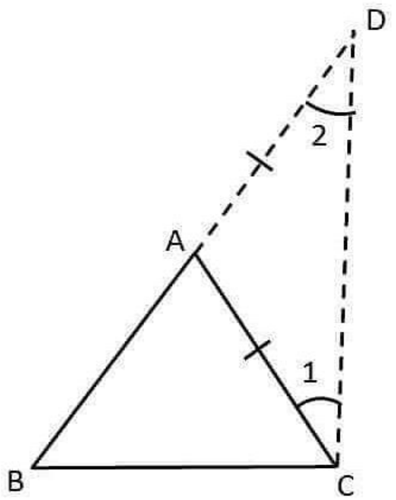
The sum of any two sides of a triangle is greater than the third side.



Given :- A triangle ABC

To Prove :- AB + AC > BC .

Construction:- Extend AB to D such that AD = AC



Proof:- In Δ ACD

AD = AC (By construction)

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

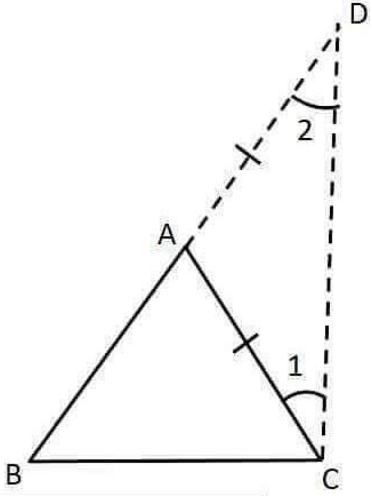
$\therefore \angle 1 = \angle 2$

Now,

$\angle BCD = \angle BCA + \angle 1$

$= \angle BCA + \angle 2$ $(\because \angle 1 = \angle 2)$

$> \angle 2$



Now, in ΔBCD

$\angle BCD > \angle 2$

By **Theorem 7.7**: Side opposite to the larger (greater) angle is longer.

$\Rightarrow BD > BC$

$\Rightarrow AB + AD > BC$ $(\because BD = AB + AD)$

$\Rightarrow AB + AC > BC$ $(\because AD = AC$ By construction$)$

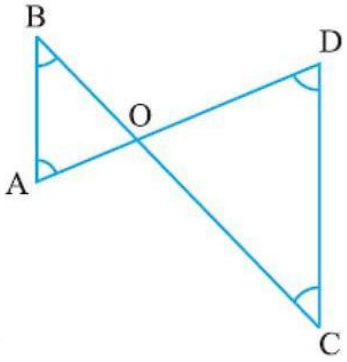
Similarly we can prove

$AB + BC > AC$

& $AC + BC > AB$

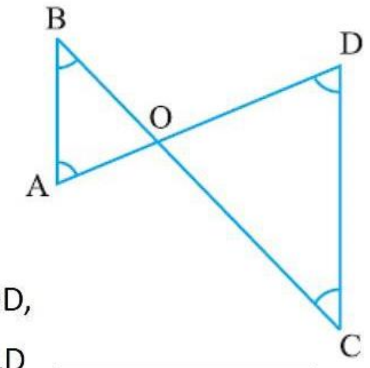
Ex7.4, 3

In the given figure, ∠B < ∠A and ∠C < ∠D. Show that AD < BC.



Ex7.4, 3

In the given figure, ∠B < ∠A and ∠C < ∠D. Show that AD < BC.



In ΔAOB,

∠B < ∠A

⇒ AO < BO (*Side opposite to the greater angle is longer*) ...(1)

In ΔCOD,

∠C < ∠D

OD < OC (*Side opposite to the greater angle is longer*) ...(2)

Adding equations (1) and (2),

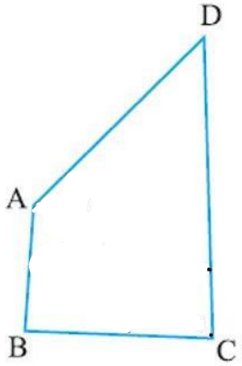
AO + OD < BO + OC

AD < BC

Hence proved

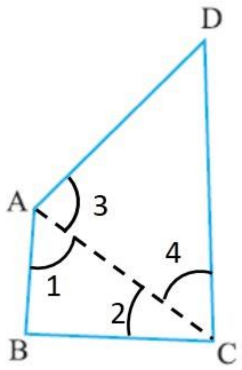
Ex7.4, 4

AB and CD are respectively the smallest and longest sides of a quadrilateral ABCD (see the given figure). Show that $\angle A > \angle C$ and $\angle B > \angle D$.



Ex7.4, 4

AB and CD are respectively the smallest and longest sides of a quadrilateral ABCD (see the given figure). Show that ∠A > ∠C and ∠B > ∠D.



Given:

AB is the smallest side ...(1)

CD is the longest side ...(2)

To prove: ∠A > ∠C & ∠B > ∠D

Proof:

Join A & C, and mark the angles

In ΔABC,

BC > AB (From (1))

∴ ∠1 > ∠2 (Angle opposite to the longer side is greater)

In ΔADC ,

CD > AD (From (2))

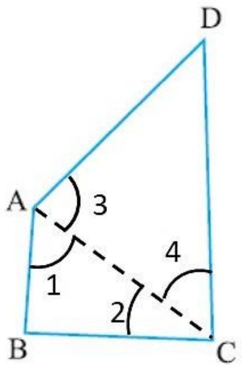
∴ ∠3 > ∠4 (Angle opposite to the longer side is greater)

Adding equations

$\angle 1 + \angle 3 \quad > \quad \angle 2 + \angle 4$

$\angle A \quad > \quad \angle C$

Now, solving for $\angle B > \angle D$

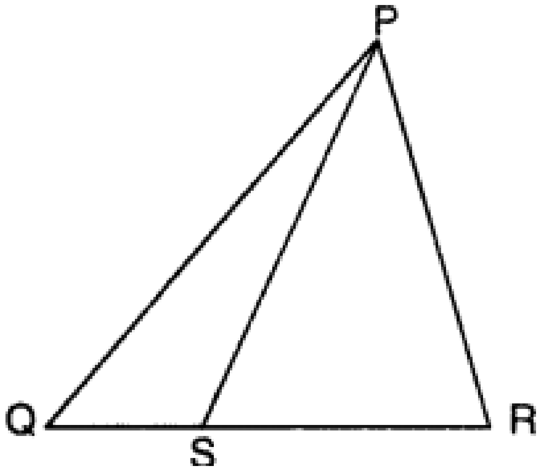


HOMEWORK ASSIGNMENT

Exercise 7.4
Question number 3,4

AHA

In figure, 'S' is any point on the side QR of APQR. Prove that PQ + QR + RP > 2PS.



THANKING YOU

ODM EDUCATIONAL GROUP

ODM EDUCATIONAL GROUP
Changing your Tomorrow