PERIOD 3

MATHEMATICS

CHAPTER NUMBER :~ 7
CHAPTER NAME :~ TRIANGLES

LEARNING OUTCOME:~

1.Students will be able to do application sums of ASA and AAS congruence rule.

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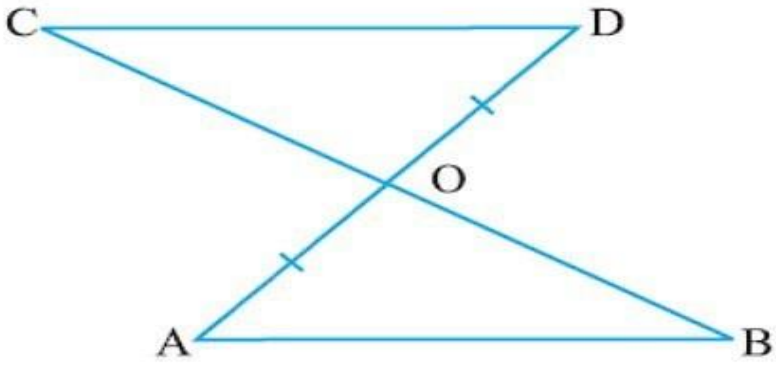
PREVIOUS KNOWLEDGE TEST

1. What is ASA congruence rule?

2. What is AAS congruence rule?

Line-segment AB is parallel to another line-segment CD. O is the mid-point of AD (see figure). Show that (i) $\Delta AOB \cong \Delta DOC$ (ii) O is also the mid point of BC



Given:

AB || CD

O is the mid-point of AD

i.e. OA = OD ...(1)

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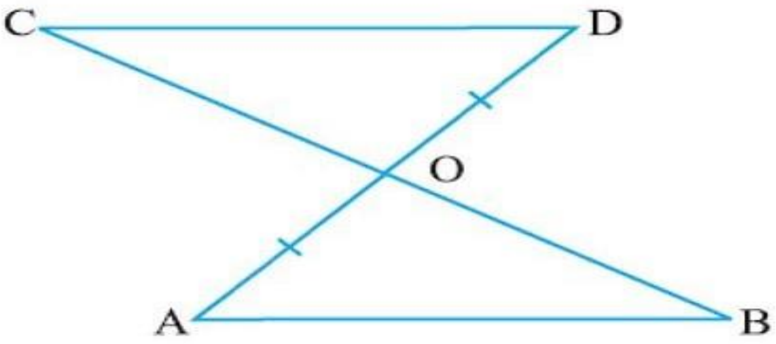
AB || CD

O is the mid-point of AD

i.e. OA = OD ...(1)



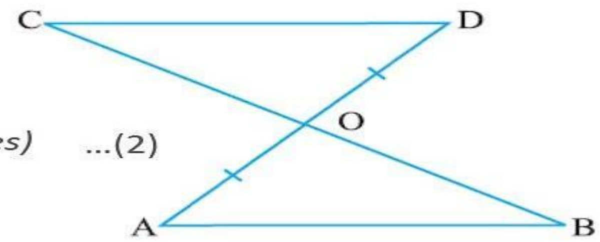
To prove:

(i) $\Delta AOB \cong \Delta DOC$

(ii) O is also the mid point of BC i.e. OB = OC

Proof

AB || CD



and BC is the transversal,

∠ABO = ∠ DCO *(Alternate angles)* ...(2)

Also, since lines AD & BC intersect

∠AOB = ∠ DOC *(Vertically opposite angles)* ...(3)

Consider Δ AOB and Δ DOC.

∠ABO = ∠ DCO *(From (2))*

∠AOB = ∠ DOC *(From (3))*

OA = OD *(From (1))*

∴ Δ AOB ≅ Δ DOC *(AAS congruence rule)*

So, OB = OC *(CPCT)*

Hence proved

In ΔABC, the bisector AD of $\angle A$ is perpendicular to side BC (see figure). Show that AB = AC and ΔABC is isosceles.

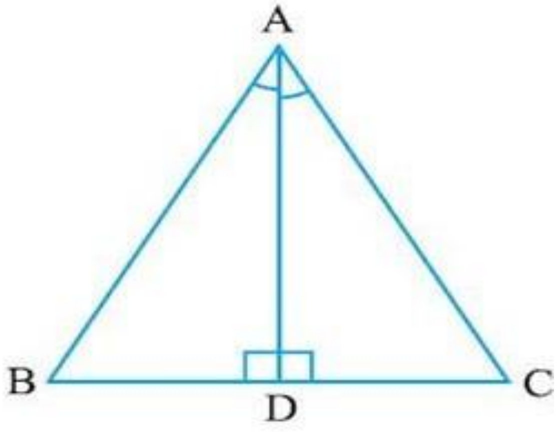
Given:

AD is bisector of $\angle A$

So, $\angle BAD = \angle CAD$ ...(1)

Also, AD is perpendicular to BC

So, $\angle ADB = \angle ADC = 90°$ ...(2)



To prove: AB = AC & ΔABC is isosceles

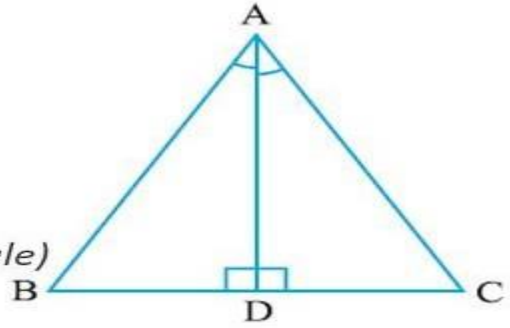
In ΔABD and ΔACD,

$\angle BAD = \angle CAD$ *(From (1))*

$AD = AD$ *(Common)*

$\angle ADB = \angle ADC$ *(From (2))*

So, $\Delta ABD \cong \Delta ACD$ *(ASA congruence rule)*

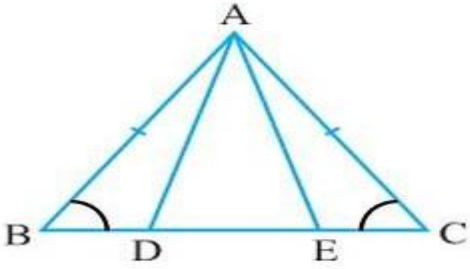


So, $AB = AC$ *(CPCT)*

Since 2 sides of triangle are equal

ΔABC is an isosceles triangle

In an isosceles triangle ABC with AB = AC, D and E are points on BC such that BE = CD (see figure). Show that AD = AE.



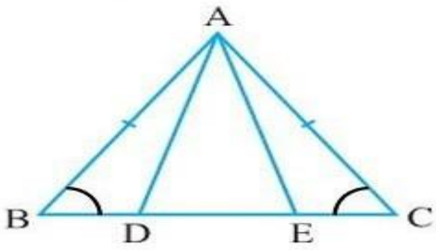
Given:

Δ ABC is isosceles,

So, AB = AC

Also, BE = CD

To prove: AD = AE



To prove: AD = AE

Proof:

Since

AB = AC

Therefore, ∠ C = ∠ B *(Angles opposite to equal sides are equal)* ...(1)

In Δ ACD and Δ ABE,

AC = AB *(Given)*

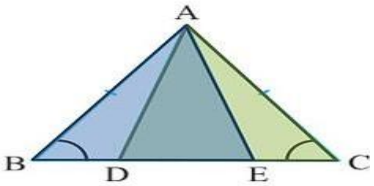
$\angle$ C = $\angle$ B *(From (1))*

CD = BE *(Given)*

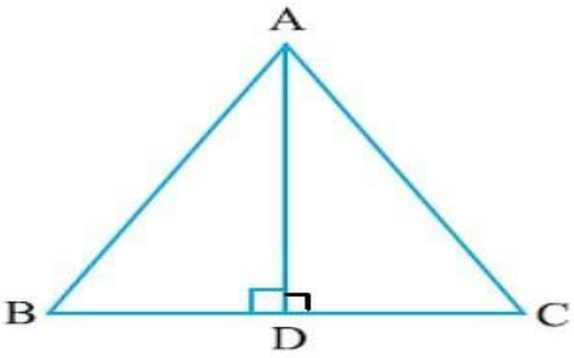
So, Δ ACD $\cong$ Δ ABE *(SAS congruence rule)*

$\therefore$ AD = AE *(CPCT)*

Hence proved



In ΔABC, AD is the perpendicular bisector of BC (see the given figure). Show that ΔABC is an isosceles triangle in which $AB = AC$.



Given:

Line AD is perpendicular to BC

So, $\angle ADC = \angle ADB = 90°$ ...(1)

& Line AD bisects line BC

(as it is perpendicular bisector)

$BD = CD$ ...(2)

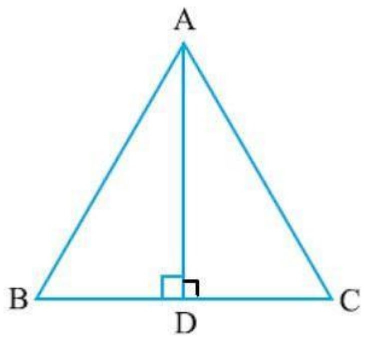
In ΔABD and ΔACD,

$AD = AD$ *(Common)*

$\angle ADB = \angle ADC$ *(From (1))*

$BD = CD$ *(From (2))*

$\therefore \Delta ADC \cong \Delta ADB$ *(SAS congruence rule)*

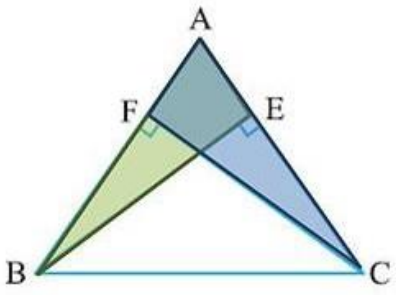


$\therefore AB = AC$ *(CPCT)*

Therefore, ABC is an isosceles triangle in which AB = AC.

Hence proved

ABC is an isosceles triangle in which altitudes BE and CF are drawn to equal sides AC and AB respectively (see the given figure). Show that these altitudes are equal.



Given:

Given ΔABC is isosceles

with AB & AC equal, i.e. AB = AC ...(1)

BE and CF are altitudes.

So, ∠AEB = 90° and ∠AFC = 90° ...(2)

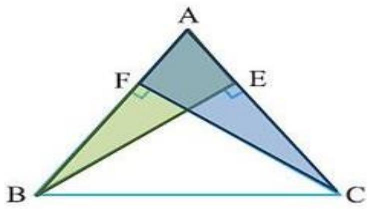
To prove: BE = CF

Proof:

We take ΔABE and ΔACF,

In ΔABE and ΔACF,

$\angle AEB = \angle AFC$	*(From (2))*
$\angle A = \angle A$	*(Common angle)*
$AB = AC$	*(From (1))*
$\therefore \Delta ABE \cong \Delta ACF$	*(AAS congruence rule)*
$\Rightarrow BE = CF$	*(CPCT)*

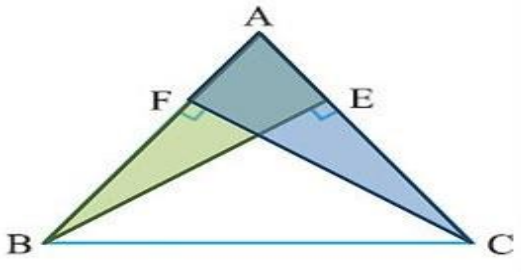


Hence proved

ABC is a triangle in which altitudes BE and CF to sides AC and AB are equal (see the given figure). Show that

(i) $\Delta ABE \cong \Delta ACF$

(ii) AB = AC, i.e., ABC is an isosceles triangle.



Given:

BE = CF ...(1)

BE and CF are altitudes.

So, $\angle AEB = 90°$ and $\angle AFC = 90°$ ...(2)

To prove: $\Delta ABE \cong \Delta ACF$ & AB = AC

In ΔABE and ΔACF,

$\angle AEB = \angle AFC$ *(From (2))*

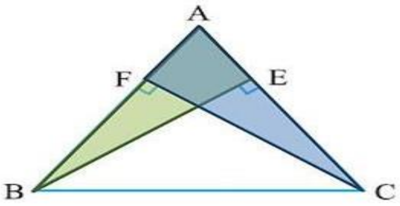
$\angle A = \angle A$ *(Common angle)*

$BE = CF$ *(From (1))*

$\therefore \Delta ABE \cong \Delta ACF$ *(AAS congruence rule)*

$\Rightarrow AB = AC$ *(CPCT)*

Hence proved

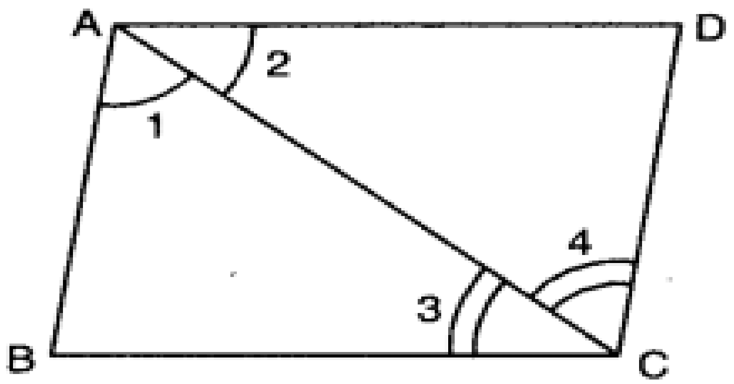


HOMEWORK ASSIGNMENT

Exercise 7.2 Qno 1,2,3,4

AHA

In the given figure, if ∠1 = ∠2 and ∠3 = ∠4, then prove that BC = CD.



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