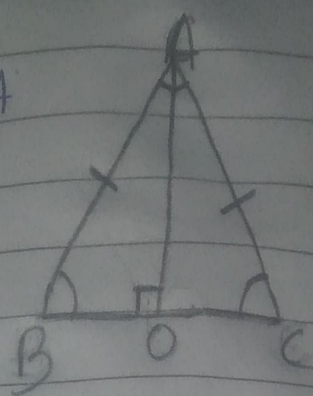
3/7/21

HW Exercise 7.2

(1) In an isosceles triangle ABC, with AB = AC, the bisectors of ∠B and ∠C intersect each other at O. Join A to O. Show that:

i) OB = OC ii) AO bisects ∠A



⇒ Given: In ΔABC, AB = AC

To prove: ∠C = ∠B

Const → Join AO

Proof: In ΔABO and ΔACO

AB = AC (given)

∠BAO = ∠CAO (AO is the bisector of ∠A)

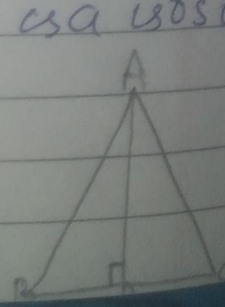
AO = AO (common)

∴ $\Delta ABO \cong \Delta ACO$ (SAS)

∴ OB = OC (CPCT)

2) In ΔABC, AD is the perpendicular bisector of BC. Show that ΔABC is a isosceles traingle in which AB = AC.

⇒ Given: AB = AC, AD ⊥ BC



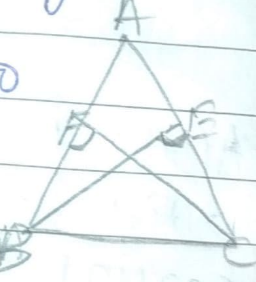
In AB = AC

$\angle FBC = \angle ECB$ (Angle opposite to equal sides)

$\triangle BFC \cong \triangle CEB$ (AAS)

BE = CF (cpct)

4) ABC is a traingle in which altitudes BE and CF to sides AC and AB are equal. Show that : i) $\triangle ABE \cong \triangle ACF$
ii) AB = AC, i.e. ABC is an isosceles traingles.



⇒ Given :- BE and CF are two equal altitudes.

To prove :- (i) $\triangle ABE \cong \triangle ACF$

(ii) AB = AC.

proof :- BE = CF (given)

$\angle AEB = \angle AFC$ (90° given)

$\angle A = \angle A$ (common)

$\triangle ABE \cong \triangle ACF$ (AAS)

$\angle ABE = \angle ACF$ (cpct)

⇒ To prove :- (i) BD = CD (ii) ∠1 = ∠2

proof :- In △ABD and △ACD

AB = AC (given)

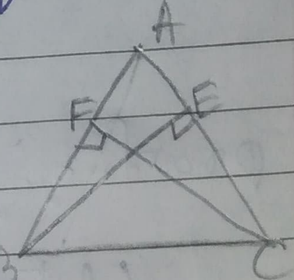
AD = DA (common)

∠B = ∠C (Angle opposite to equal side)

△ADB ≅ △ACD (RHS)

BD = CD
∠1 = ∠2 (CPCT)

3) ABC is an isosceles traingle in which altitudes BE and CF are drawn to equal sides AC and AB respectively. Show that these altitudes are equal.



⇒ Given, → In △ABC,
AB = AC
BE and CF are altitudes.

To prove :- BE = CF

proof :- In △BFC and △CEB

∠BFC = ∠CEB (90°)
BC = CB (common)