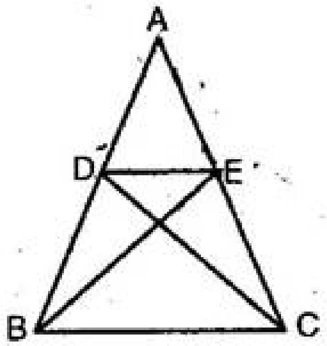
Exercise 6.3

6. In figure, if $\Delta ABE \cong \Delta ACD$, show that $\Delta ADE \sim \Delta ABC$.



Ans. It is given that $\Delta ABE \cong \Delta ACD$

$\therefore$ AB = AC and AE = AD

$\Rightarrow \dfrac{AB}{AD} = \dfrac{AC}{AE}$

$\Rightarrow \dfrac{AB}{AC} = \dfrac{AD}{AE}$ ....(1)

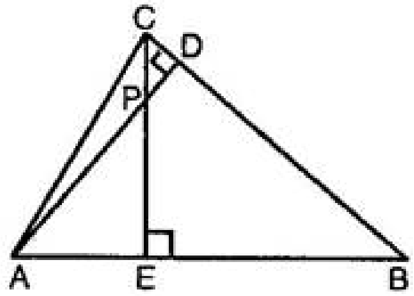
$\therefore$ In Δs ADE and ABC, we have,

$\dfrac{AB}{AC} = \dfrac{AD}{AE}$ [from eq.(1)]

And $\angle BAC = \angle DAE$ [Common]

Thus, by SAS criterion of similarity, $\Delta ADE \sim \Delta ABC$

7. In figure, altitude AD and CE of a ΔABC intersect each other at the point P. Show that:



(i) $\Delta AEP \sim \Delta CDP$

(ii) $\Delta ABD \sim \Delta CBE$

(iii) $\Delta AEP \sim \Delta ADB$

(iv) $\Delta PDC \sim \Delta BEC$

Ans. (i) In Δs AEP and CDP, we have,

$\angle AEP = \angle CDP = 90^\circ$ [$\because$ $CE \perp AB$, $AD \perp BC$]

And $\angle APE = \angle CPD$ [Vertically opposite]

$\therefore$ By AA-criterion of similarity, $\Delta AEP \sim \Delta CDP$

(ii) In $\triangle$s ABD and CBE, we have,

$\angle ADB = \angle CEB = 90^\circ$

And $\angle ABD = \angle CBE$ [Common]

$\therefore$ By AA-criterion of similarity, $\triangle ABD \sim \triangle CBE$

(iii) In $\triangle$s AEP and ADB, we have,

$\angle AEP = \angle ADB = 90^\circ$ [$\because$ $AD \perp BC$, $CE \perp AB$]

And $\angle PAE = \angle DAB$[Common]

$\therefore$ By AA-criterion of similarity, $\triangle AEP \sim \triangle ADB$

(iv) In $\triangle$s PDC and BEC, we have,

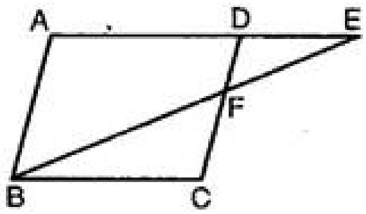
$\angle PDC = \angle BEC = 90^\circ$ [$\because$ $CE \perp AB$, $AD \perp BC$]

And $\angle PCD = \angle BEC$[Common]

$\therefore$ By AA-criterion of similarity, $\triangle PDC \sim \triangle BEC$

8. E is a point on the side AD produced of a parallelogram ABCD and BE intersects CD at F. Show that $\triangle ABE \sim \triangle CFB$.

Ans. In $\triangle$s ABE and CFB, we have,



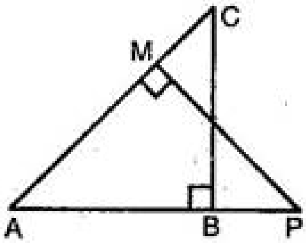
$\angle AEB = \angle CBF$[Alt. $\angle$ s]

$\angle A = \angle C$ [opp. $\angle$ s of a $\parallel$gm]

$\therefore$ By AA-criterion of similarity, we have

$\triangle ABE \sim \triangle CFB$

9. In figure, ABC and AMP are two right triangles, right angles at B and M respectively. Prove that:



(i) $\Delta ABC \sim \Delta AMP$

(ii) $\frac{CA}{PA} = \frac{BC}{MP}$

Ans. (i) In Δs ABC and AMP, we have,

$\angle ABC = \angle AMP = 90^\circ$ [Given]

$\angle BAC = \angle MAP$ [Common angles]

$\therefore$ By AA-criterion of similarity, we have

$\Delta ABC \sim \Delta AMP$

(ii) We have $\Delta ABC \sim \Delta AMP$ [As prove above]

$\Rightarrow \frac{CA}{PA} = \frac{BC}{MP}$

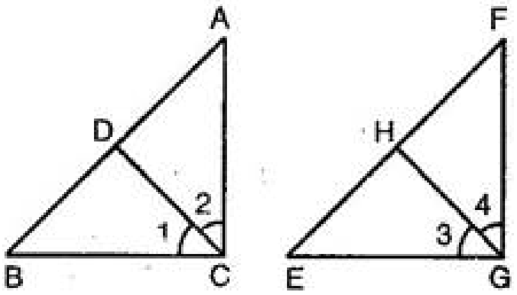
10. CD and GH are respectively the bisectors of $\angle ACB$ and $\angle EGF$ such that D and H lie on sides AB and FE at ΔABC and ΔEFG respectively. If $\Delta ABC \sim \Delta FEG$, show that:

(i) $\frac{CD}{GH} = \frac{AC}{FG}$

(ii) $\Delta DCB \sim \Delta HE$

(iii) $\Delta DCA \sim \Delta HGF$

Ans. We have, $\Delta ABC \sim \Delta FEG$



$\Rightarrow \angle A = \angle F$.........(1)

And $\angle C = \angle G$

$\Rightarrow \frac{1}{2}\angle C = \frac{1}{2}\angle G$

$\Rightarrow \angle 1 = \angle 3$ and $\angle 2 = \angle 4$ ....(2)

[$\because$ CD and GH are bisectors of $\angle C$ and $\angle G$ respectively]

$\therefore$ In Δs DCA and HGF, we have

$\angle A = \angle F$[From eq.(1)]

$\angle 2 = \angle 4$[From eq.(2)]

$\therefore$ By AA-criterion of similarity, we have

$\Delta DCA \sim \Delta HGF$

Which proves the (iii) part

We have, $\Delta DCA \sim \Delta HGF$

$\Rightarrow \frac{AG}{FG} = \frac{CD}{GH}$

$\Rightarrow \frac{CD}{GH} = \frac{AC}{FG}$

Which proves the (i) part

In Δs DCA and HGF, we have

$\angle 1 = \angle 3$[From eq.(2)]

$\angle B = \angle E$[$\because \Delta DCB \sim \Delta HE$]

Which proves the (ii) part

********** END *********