In fig AB = AC and AD is the bisector

Exercise 7.1

1.) In $\triangle ABC$ and $\triangle ABD$ we have
$AC = AD$ Given
$\angle CAB = \angle DAB$

$AB = AB$
$\triangle ABC \cong \triangle ABD$
[By SAS congruence]

Therefore, $BC = BD$ (CPCT).

2.) In the given figure, ABCD is a quadrilateral in which $AD = BC$ and $\angle DAB = \angle CBA$

In $\triangle DAB$ and $\triangle CBA$
$AB = AB$
$\triangle ABD \cong \triangle BAC$
$BD = AC$
$\angle ABD = \angle BAC$

3.) In $\triangle AOD$ and $\triangle BOC$, we have
$\angle AOD = \angle BOC$
[Vertically opposite angle]

$\angle CBO = \angle DAO$ [Each $= 90^\circ$]

and $AD = BC$

$\triangle AOD \cong \triangle BOC$

$AO = BO$

Also, $AO = BO$

Hence, CD bisects AB.

4.) In the given fig, ABCD is a parallelogram in which AC is a diagonal i.e $AB \parallel DC$ and $BC \parallel AD$

In $\triangle ABC$ and $\triangle CDA$ we have

$\angle BAC = \angle DCA$ [Alternate angle]

$\angle BCA = \angle DCA$

$AC = AC$ [Alternate angles]

$\triangle ABC \cong \triangle CDA$ [By ASA congruence]