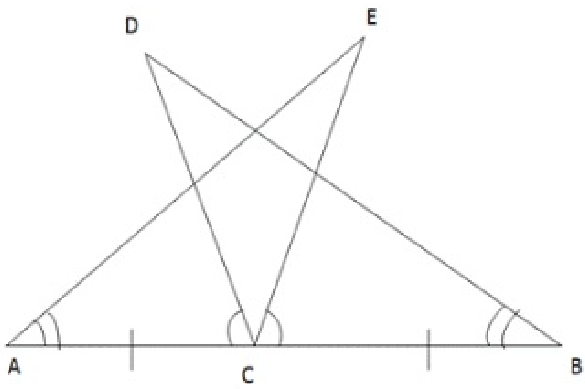
Exercise 5A

Question 15:

Given: C is the mid point of a line segment AB, and D is point such that,



$\angle DCA = \angle ECB$

and $\angle DBC = \angle EAC$

Toprove : DC = EC

Proof: In ΔACE and ΔDCB we have;

$AC = BC$ [Given]

$\angle EAC = \angle DBC$ [Given]

Also, $\angle DCA = \angle CDB + \angle DBA$ because exterior $\angle DCA$ in ΔDCB is equal to sum of interior opposite angles.

Again in $\angle ACE$, we have

ext.$\angle BCE = \angle CAE + \angle AEC$

But, $\angle DCA = \angle BCE$ [Given]

$\Rightarrow$ $\angle CDB + \angle DBA = \angle CAE + \angle AEC$

$\Rightarrow$ $\angle CDB = \angle AEC$ [$\because$ $\angle DBA = \angle CAE$ (given)]

Thus in ΔACE and ΔDCB,

$\angle EAC = \angle DBC$

$AC = BC$

and, $\angle AEC = \angle CDB$

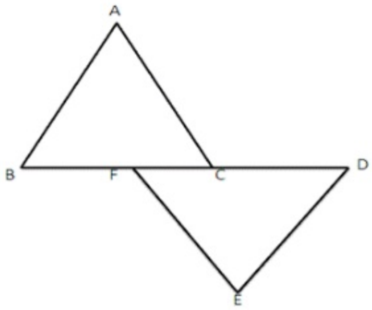
Thus by Angle-Side-Angle criterion of congruence, we have

$\Delta ACE \cong \Delta DCB$ (By ASA)

The corresponding parts of the congruent triangles are equal.

So, $DC = CE$ [by c.p.c.t]

Question 16:



Given: $AB \perp AC$ and $DE \perp FE$ such that,
$AB = DE$ and $BF = CD$
To prove : $AC = EF$
Proof: In ΔABC, we have,
$BC = BF + FC$
and , in ΔDEF
$FD = FC + CD$
But, $BF = CD$ [Given]
So, $BC = BF + FC$
and, $FD = FC + BF$
$\Rightarrow$ $BC = FD$

So, in ΔABC and ΔDEF, we have,
$\angle BAC = \angle DEF = 90^o$ [Given]
$BC = FD$ [Proved above]
$AB = DE$ [Given]

Thus, by Right angle-Hypotenuse-Side criterion of congruence, we have
$\Delta ABC \cong \Delta DEF$ [By RHS]

The corresponding parts of the congruent triangles are equal.
So, $AC = EF$ [C.P.C.T]

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