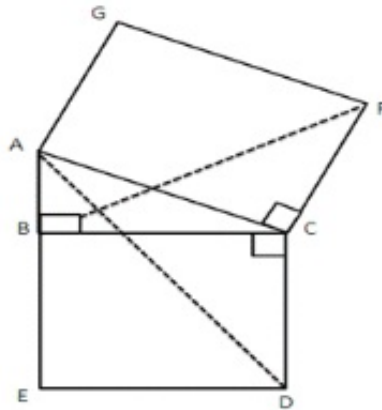Exercise 5A

Question 23:

Given : ABC is a triangle, right angled at B. ACFG is a
a square and BCDE is a square.

To prove: AD = EF

Proof: Since BCDE is a square,

$$\angle BCD = 90^0 \ldots (1)$$

In $\triangle ACD$,

$$\angle ACD = \angle ACB + \angle BCD$$
$$= \angle ACB + 90^0 \ldots (2)$$

In $\triangle BCF$,

$$\angle BCF = \angle BCA + \angle ACF$$

Since ACFG is a square,

$$\angle ACF = 90^0$$

Thus, we have

$$\angle BCF = \angle BCA + 90^0 \ldots (3)$$

From (2) and (3), we have

$$\angle ACD = \angle BCF \qquad \ldots (4)$$

Thus in $\triangle ACD$ and $\triangle BCF$, we have

AC = CF   [sides of a square]
$\angle ACD = \angle BCF$ [from (4)]
CD = BC   [sides of a square]

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

$\therefore$ $\triangle ACD \cong \triangle BCF$ [By SAS]

The corresponding parts of congruent triangles are equal.

So,   AD = BF   (C.P.C.T)

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