



**Topic:** Conjugate of a Complex Number  
Ex. 2.6, Q. 6, (page 42)

**Information:**

## 2.5.3 Conjugate of a Complex Number

If we change  $i$  to  $-i$  in  $z = a + bi$ , we obtain another complex number  $a - bi$  called the complex conjugate of  $z$  and is denoted by  $\bar{z}$  (read  $z$  bar).

Thus, if  $z = -1 - i$ , then  $\bar{z} = -1 + i$ .

The numbers  $a + bi$  and  $a - bi$  are called conjugates of each other.

**Note that:**

- (i)  $\bar{\bar{z}} = z$
- (ii) The conjugate of a real number  $z = a + 0i$  coincides with the number itself, since  $\bar{z} = \overline{a + 0i} = a - 0i$ .
- (iii) conjugate of a real number is the same real number.

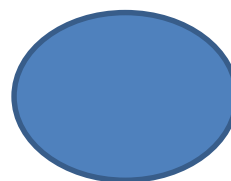
**Working (C.W) Ex 2.6, Q. 6,**

**Q. 6: If  $z = 2 + 3i$  and  $w = 5 - 4i$**

(i)  $\overline{z + w} = \bar{z} + \bar{w}$   
L.H.S =  $\overline{z + w}$   
 $= \overline{2 + 3i + 5 - 4i}$   
 $= \overline{7 - i}$   
 $= \bar{7} + \overline{-i}$   
 $= 7 + i$

R.H.S =  $\bar{z} + \bar{w}$   
 $= \overline{2 + 3i} + \overline{5 - 4i}$   
 $= \bar{2} + \bar{3i} + \bar{5} + \overline{-4i}$   
 $= 2 - 3i + 5 + 4i$   
 $= 7 + i$

L.H.S = R.H.S



**Practice:**

**Ex 2.6**

**Q. 6:** If  $z = 2 + 3i$  and  $w = 5 - 4i$  then show that

(ii)  $\overline{z - w} = \bar{z} - \bar{w}$

(iii)  $\overline{zw} = \bar{z}\bar{w}$

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