

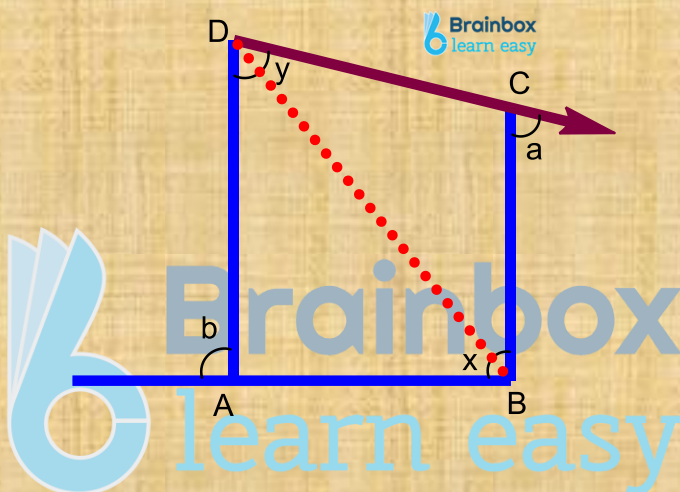
CHAPTER 03

CONSTRUCTION OF QUADRILATERALS

Example:

The sides BA and DC of a quadrilateral ABCD are produced as shown in the diagram. Prove that $a + b = x + y$.

Sol.



Join BD

In $\triangle ABD$, we have

$$\angle ABD + \angle ADB = b \dots\dots\dots (i)$$

In $\triangle CBD$, we have

$$\angle CBD + \angle CDB = a \dots\dots\dots (ii)$$

Adding (i) and (ii), we get

$$(\angle ABD + \angle CBD) + (\angle ADB + \angle CDB) = a + b$$

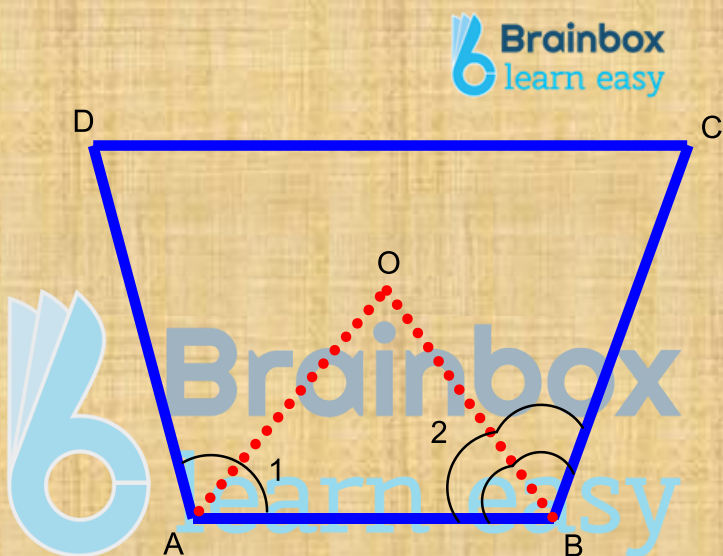
$$\Rightarrow x + y = a + b$$

Hence, $x + y = a + b$

Example:

In a quadrilateral ABCD, AO and BO are the bisectors of $\angle A$ and $\angle B$ respectively. Find $\angle AOB$.

Sol.



In $\triangle AOB$, we have

$$\angle AOB + \angle 1 + \angle 2 = 180^\circ$$

$$\Rightarrow \angle AOB = 180^\circ - (\angle 1 + \angle 2) \quad [\because \angle 1 = \frac{1}{2}\angle A \text{ and } \angle 2 = \frac{1}{2}\angle B]$$

$$\Rightarrow \angle AOB = 180^\circ - \frac{1}{2}(\angle A + \angle B)$$

$$\Rightarrow \angle AOB = 180^\circ - \frac{1}{2}(360^\circ - (\angle C + \angle D))$$

$$\Rightarrow \angle AOB = 180^\circ - 180^\circ + \frac{1}{2}(\angle C + \angle D)$$

$$[\because \angle A + \angle B + \angle C + \angle D = 360^\circ]$$

$$[\because \angle A + \angle B = 360^\circ - (\angle C + \angle D)]$$

$$\Rightarrow \angle AOB = \frac{1}{2}(\angle C + \angle D)$$

