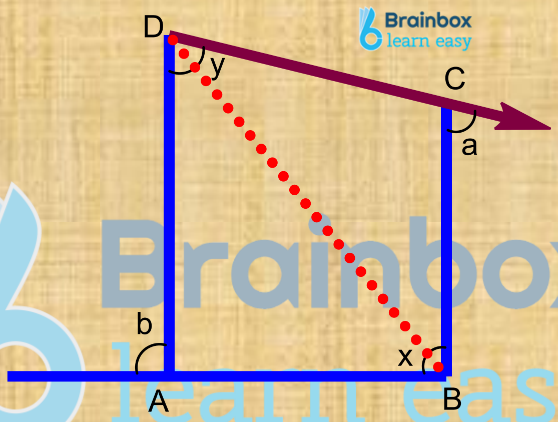
CHAPTER 03

Understanding 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 ΔABD, we have

$\underline{|ABD} + \underline{|ADB} = b$ .... (i)

In ΔCBD, we have

$\underline{|CBD} + \underline{|CDB} = a$ ....(ii)

Adding (i) and (ii), we get

$\left(\underline{|ABD} + \underline{|CBD}\right) + \left(\underline{|ADB} + \underline{|CDB}\right) = a + b$

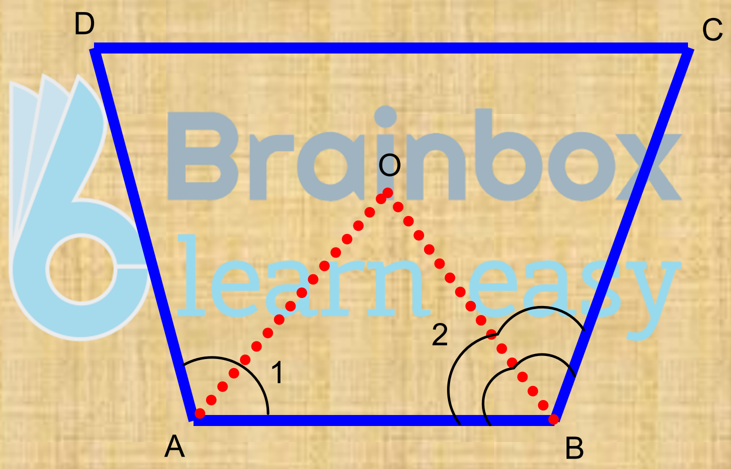
$\Rightarrow x^0 + y^0 = a^0 + b^0$

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 ΔAOB, we have

$\angle AOB + \angle 1 + \angle 2 = 180^0$

$\Rightarrow \angle AOB = 180^0 - (\angle 1 + \angle 2)$ $\quad [\because \angle 1 = \frac{1}{2}\angle A$ and $\angle 2 = \frac{1}{2}\angle B]$

$\Rightarrow \angle AOB = 180^0 - \frac{1}{2}(\angle A + \angle B)$

$$\Rightarrow \angle AOB = 180^0 - \frac{1}{2}\left(360^0 - \left(\angle C + \angle D\right)\right)$$

$$\Rightarrow \angle AOB = 180^0 - 180^0 + \frac{1}{2}\left(\angle C + \angle D\right)$$

$$\left[\because \angle A + \angle B + \angle C + \angle D = 360^0\right]$$

$$\left[\because \angle A + \angle B = 360^0 - \left(\angle C + \angle D\right)\right]$$

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