CHAPTER – 11
CONSTRUCTION

11.1 DIVISION OF A LINE SEGENT

In order to divide a line segment internally is a given ratio m: n, where both m and n are positive integers, we follow the following steps:

Step of construction :

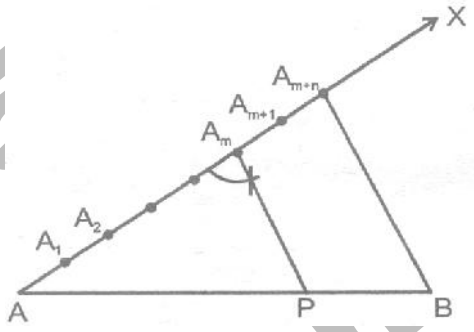
(i) Draw a line segment AB of given length by using a ruler.

(ii) Draw and ray AX making an acute angle with AB.

(iii) Along AX mark off (m + n) points A_1, A_2,..., A_{m+n} such that $AA_1 = A_1A_2 = ...=A_{m+n+}A_{m+n}$.

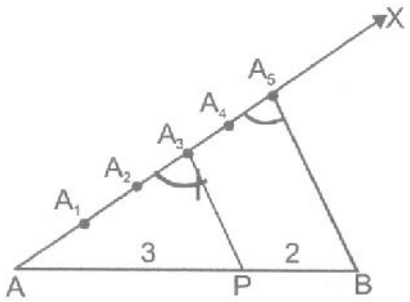
(iv) Join B A_{m+n}

(v) Through the point A_m draw a line parallel to A_{m+n} B by making an angle equal to $\angle AA_{m+n}B$ at A_m. Suppose this line meets AB at a point P.
The point P so obtained is the required point which divides AB internally in the ratio m : n.



Ex.1 Divide a line segment of length 12 cm internally in the ratio 3 : 2.
Sol. Following are the steps of construction.
Step of construction :
(i) Draw a line segment AB = 12 cm by using a ruler.
(ii) Draw any ray making an acute angle $\angle BAX$ with AB.
(iii) Along AX, mark-off 5 (=3 + 2) points A_1,A_2,A_3,A_4 and A_5 such that $AA_1 = A_1A_2 = A_2A_3 = A_3A_4 = A_4A_5$.
(iv) Join BA_5

(v) Through A_3 draw a line A_3P parallel to A_5B by making an angle equal to $\angle AA_5$ B at A_3 intersecting AB at a point P.



The point P so obtained is the required point, which divides AB internally in the ratio 3 : 2.

ALTERNATIVE METHOD FOR DIVISION OF A LINE SEGMENT INTERNALLY IN A GIVEN RATIO :

Use the following steps to divide a given line segment AB internally in a given ration m : n, where m and natural members.

Steps of Construction :

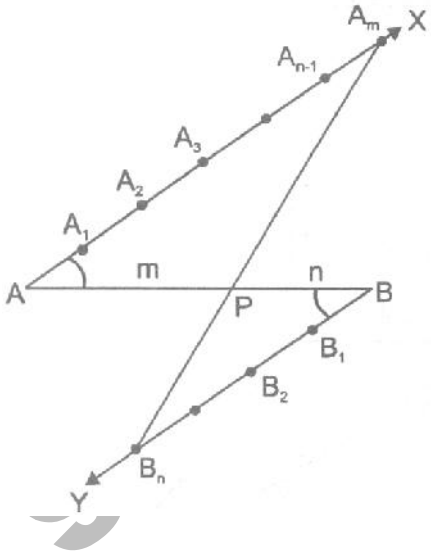
(i) Draw a line segment AB of given length.

(ii) Draw any ray AZ making an acute angle $\angle BAX$ with AB.

(iii) Draw a ray BY, on opposite side of AX, parallel to AX making an angle $\angle ABY$ equal to $\angle BAX$.

(iv) Mark off a points $A_1, A_2,....A_m$ on AX and n points $B_1, B_2,...B_n$ on BY such that $AA_1 = A_1A_2 = ... = A_{m-1}A_m = B_1B_2 = ...B_{n-1}B_n$.

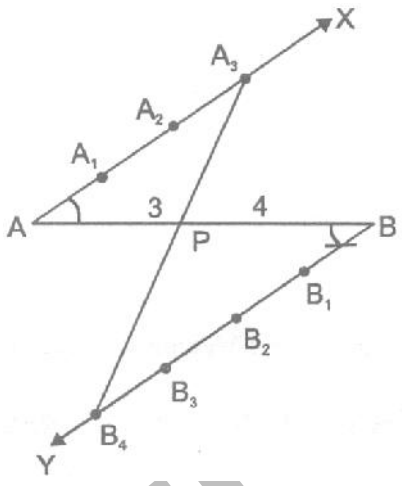
(v) Join A_mB_n. Suppose it intersect AB at P.



The point P is the required point dividing AB in the ratio m : n.

Ex.2 Decide a line segment of length 6 cm internally in the ratio 3:4.

Sol. Follow the following steps :



Steps of Construction :

(i) Draw a line segment AB of length 6 cm.

(ii) Draw any ray AX making an acute angle $\angle BAX$ with AB.

(iii) Draw a ray BY parallel to AX by making $\angle ABY$ equal to $\angle BAX$.

(iv) Mark of three point A_1, A_2, A_3 on AX and 4 points B_1, B_2m B_3, B_4 on BY such that $AA_1 = A_1A_2 = A_2A_3 = BB_1 = B_1B_2 = B_2B_3 = B_2B_4$.

(v) Join A_3B_4. Suppose it intersects AB at a point P.

Then, P is the point dividing AB internally in the ratio 3:4.