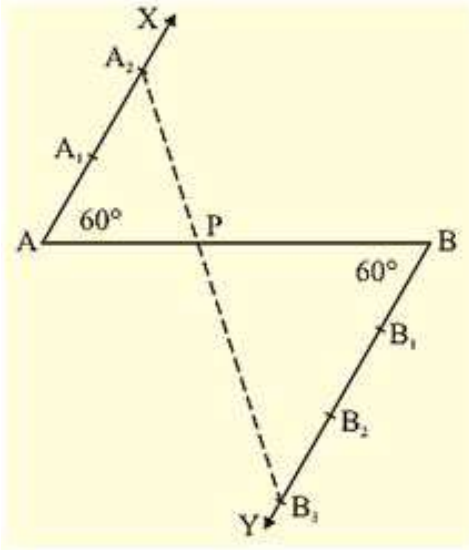# RD SHARMA

Solutions

Class 10 Maths

Chapter 11

Ex 11.1

Q.1: Determine a point which divides a line segment of length 12 cm internally in the ratio of 2:3. Also, justify your construction.

Solution:

Steps of Construction:

1. Draw a line segment AB of 12 cm

2. Through the points A and B draw two parallel line on the opposite side of AB

3. Cut 2 equal parts on AX and 3 equal parts on BY such that $AX_1=X_1X_2$ $AX_1 = X_1X_2$ and $BX_1=Y_1Y_2=Y_2Y_3 BX_1 = Y_1Y_2 = Y_2Y_3$.

4. Join $X_2Y_3 X_2Y_3$ which intersects AB at $P \therefore APPB = 23 \therefore \frac{AP}{PB} = \frac{2}{3}$.

Justification:

In $\Delta AX_2P \Delta AX_2P$ and $\Delta BY_3P \Delta BY_3P$, we have

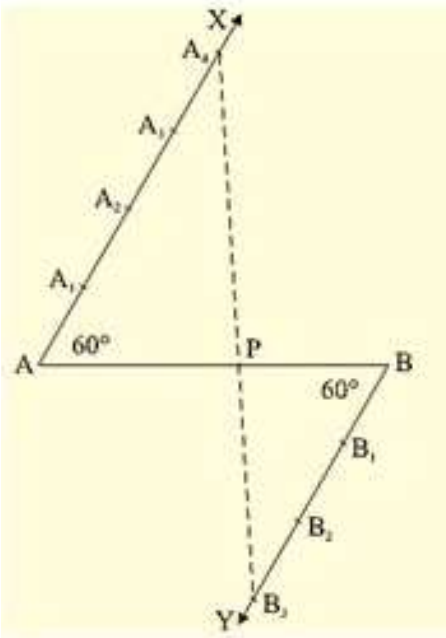$\angle APX_2 = \angle BPY_3 \angle APX_2 = \angle BPY_3$ { Because they are vertically opposite angle}

$\angle X_2AP = \angle Y_3BP \angle X_2AP = \angle Y_3BP$ { Because they are alternate interior angles }

$\Delta AX_2P \Delta AX_2P$ $\Delta BY_3P \Delta BY_3P$ { Because AA similarity }

$\therefore$ APBP = AX$_2$BY$_3$ = 23 $\dfrac{AP}{BP} = \dfrac{AX_2}{BY_3} = \dfrac{2}{3}$ { Because of C.P.C.T }

Q.2: Divide a line segment of length 9 cm internally in the ratio 4:3. Also, give justification for the construction.

Solution:

Steps of construction:

1. Draw a line segment AB of 9 cm

2. Through the points, A and B, draw two parallel lines AX and BY on the opposite side of AB

3. Cut 4 equal parts on AX and 3 equal parts on BY such that: $AX_1 = X_1X_2 = X_2X_3 = X_3X_4$
$AX_1 = X_1X_2 = X_2X_3 = X_3X_4$ and $BY_1 = Y_1Y_2 = Y_2Y_3 BY_1 = Y_1Y_2 = Y_2Y_3$

4. Join $X_4Y_3 X_4Y_3$ which intersects AB at P

$\therefore$ APPB = 43 $\therefore$ $\dfrac{AP}{PB} = \dfrac{4}{3}$

Justification:

In $\triangle APX_4$ and $\triangle BPY_3$, we have

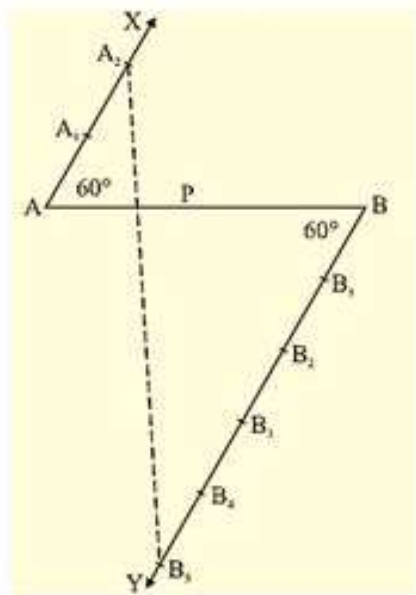$\angle APX_4 = \angle BPY_3$ { Because they are vertically opposite angles }

$\angle PAX_4 = \angle PBY_3$ { Because they are alternate interior angle}

$\triangle APX_4 \sim \triangle BPY_3$ { Because AA similarity }

$\therefore \frac{PA}{PB} = \frac{AX_4}{BY_3} = \frac{4}{3}$ { Because of C.P.C.T }

Q.3: Divide a line segment of length 14 cm internally in the ratio 2:5. Also, give justification for the construction.

Solution:

Steps of construction:

(i) Draw a line segment AB of 14 cm

(ii) Through the points A and B, draw two parallel lines AX and BY on the opposite side of AB

(iii) Starting from A, Cut 2 equal parts on AX and starting from B, cut 5 equal parts on BY such that:

$AX_1 = X_1X_2$ and $BY_1 = Y_1Y_2 = Y_2Y_3 = Y_3Y_4 = Y_4Y_5$

(iv) Join X_2Y_5 which intersects AB at P

$\therefore APPB = 25 \therefore \frac{AP}{PB} = \frac{2}{5}$

Justification:

In $\triangle APX_2$ and $\triangle BPY_5$, we have

$\angle APX_2 = \angle BPY_5$ { Because they are vertically opposite angles }

$\angle PAX_2 = \angle PBY_5$ { Because they are alternate interior angles }

Then, $\triangle APX_2 \sim \triangle BPY_5$ { Because AA similarity }

$\therefore APPB = AX_2BY_5 = 25 \therefore \frac{AP}{PB} = \frac{AX_2}{BY_5} = \frac{2}{5}$ { Because of C.P.C.T }