

Exercise 14.2

Q.1 In $\triangle ABC$ as shown in the figure $\overline{CD}$ bisects $\angle C$ and meets $\overline{AB}$ at D. $m\overline{BD}$ is equal to

(a) 5

(b) 16

(c) 10

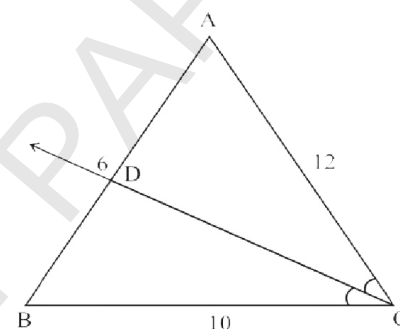
(d) 18

$$\frac{m\overline{BD}}{m\overline{DA}} = \frac{m\overline{BC}}{m\overline{CA}}$$

$$\frac{\overline{BD}}{6} = \frac{10}{12}$$

$$\overline{BD} = \frac{10^5 \times 6^2}{12^4_2} \text{ or } \overline{BD} = \frac{10 \times 6}{12} = \frac{60^5}{12}$$

$$\overline{BD} = 5$$



Q.2 In $\triangle ABC$ shown in the figure $\overline{CD}$ bisects $\angle C$. If $m\overline{AC}=3$, $\overline{CB}=6$ and $m\overline{AB}=7$ then find $m\overline{AD}$ and $\overline{DB}$

$$\overline{AB} = \overline{AD} + \overline{BD}$$

$$\overline{AD} = \overline{AB} - \overline{BD}$$

$$\overline{AD} = 7 - x$$

$$\frac{m\overline{AD}}{m\overline{BD}} = \frac{m\overline{AC}}{m\overline{CB}}$$

$$\frac{x}{7-x} = \frac{3}{6}$$

$$\frac{x}{7-x} = \frac{1}{2}$$

$$2x = 7-x$$

$$2x + x = 7$$

$$3x = 7$$

$$x = \frac{7}{3} \text{ or } \overline{AD} = \frac{7}{3}$$

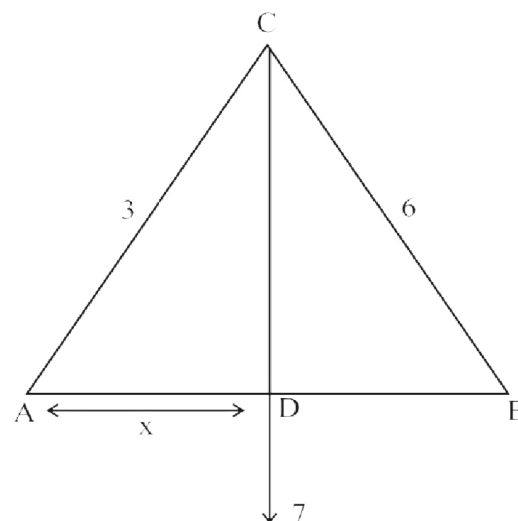
$$\overline{AB} = \overline{AD} + \overline{BD}$$

$$7 = \frac{7}{3} + \overline{BD}$$

$$7 - \frac{7}{3} = \overline{BD}$$

$$\frac{21-7}{3} = \overline{BD}$$

$$\overline{BD} = \frac{14}{3}$$



Q.3 Show that in any corresponding of two triangles if two angles of one triangle are congruent to the corresponding angles of the other, then the triangle are similar

Given

$\triangle ABC$ and $\triangle DEF$

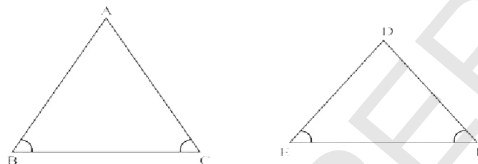
$\angle B \cong \angle E$

$\angle C \cong \angle F$

To Prove

$\triangle ABC \cong \triangle DEF$

Proof



Statements	Reasons
$\angle A + \angle B + \angle C = 180^\circ$ $\angle D + \angle E + \angle F = 180$ $\angle A \cong \angle D$ $\angle B = \angle E$ $\angle C = \angle F$ Hence $\triangle ABC \cong \triangle DEF$	Sum of three angles of a triangle = 180°

Q.4 If line segment $\overline{AB}$ and $\overline{CD}$ are intersecting at point X and $\frac{m\overline{AX}}{m\overline{XB}} = \frac{m\overline{CX}}{m\overline{XD}}$ then show that $\triangle AXC$ and $\triangle BXD$ are similar

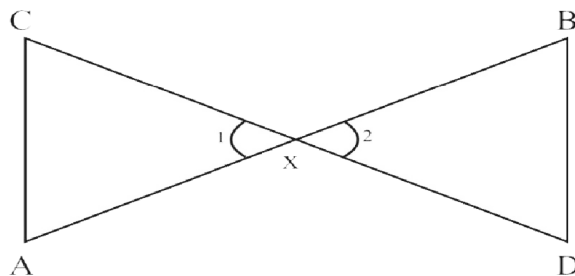
Given

Line segment $\overline{AB}$ and $\overline{CD}$ intersect at X

$$\frac{m\overline{AX}}{m\overline{XB}} = \frac{m\overline{CX}}{m\overline{XD}}$$

To Prove

$\triangle CXA$ and $\triangle DXB$ are similar



Proof

Statements	Reasons
$\frac{\overline{AX}}{\overline{XB}} = \frac{\overline{CX}}{\overline{XD}}$ $\angle 1 \cong \angle 2$ $\overline{AC} \parallel \overline{BD}$ $\angle A = m\angle B$ $m\angle C = m\angle D$ Hence proved the triangle are similar	Given Vertical angles Alternate angles