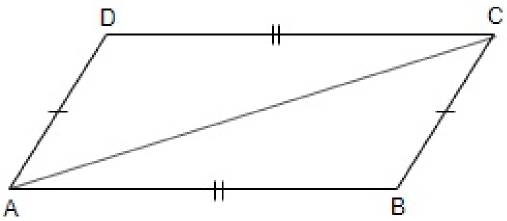
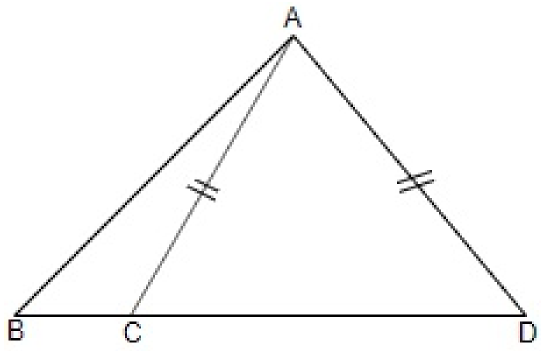
CBSE Test Paper 03

CH-7 Triangles

1. In a Δ ABC, If $\angle A = 45^0$ and $\angle B = 70^0$.Determine the shortest sides of the triangles.
   a. AC
   b. BC
   c. CA
   d. all are equal
2. In $\triangle ABC$ and $\triangle PQR$, AB = PR and $\angle A$=$\angle P$. Then, the two triangles will be congruent by SAS axiom if:
   a. BC=QR
   b. BC = PQ
   c. AC=PQ
   d. AC=QR
3. In the adjoining figure, ABCD is a quadrilateral in which AD = CB and AB = CD, then $\angle$ACB is equal to



   a. $\angle$BAC
   b. $\angle$BAD
   c. $\angle$CAD
   d. $\angle$ACD
4. Find the measure of each exterior angle of an equilateral triangle.
   a. 110°
   b. 100°
   c. 150°
   d. 120°
5. In the adjoining figure, if AC = AD, then



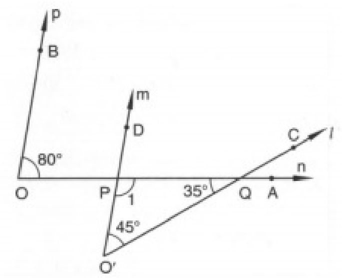
a. AB $\leq$ AD
b. AB = AD
c. AB < AD
d. AB > AD

6. Fill in the blanks:
   The sum of any two sides of a triangle is greater than ________ the median drawn to the third side.
7. Fill in the blanks:
   In any triangle, the side opposite to the larger angle is ________.

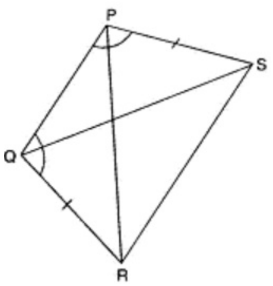
8. If the base of an isosceles triangle is produced on both sides, prove that the exterior angles so formed are equal to each other.

9. The angles of a triangle are $(x - 40)^o$, $(x - 20)^o$ and $(\frac{1}{2}x - 10)^o$. Find the value of x.

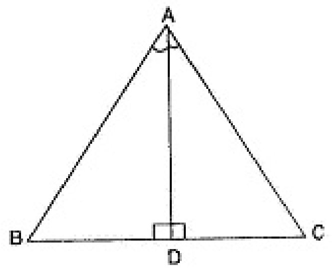
10. In a given figure, prove that p $\|$ m.



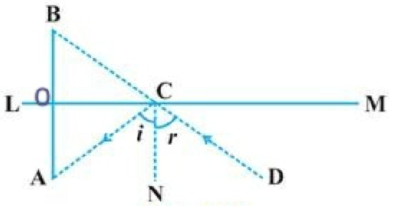
11. In figure, PS = QR and $\angle$SPQ = $\angle$RQP. Prove that PR = QS and $\angle$QPR = $\angle$PQS.



12. Prove that $\triangle ABC$ is an isosceles, if bisector of $\angle BAC$ is perpendicular to BC.

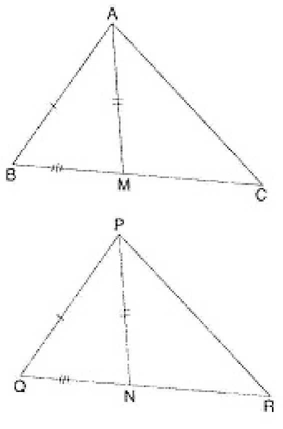


13. The image of an object placed at a point A before a plane mirror LM is seen at point B by an observer at D as shown in the figure. Prove that the image is as far behind the mirror as the object is in front of the mirror.



14. O is a point on the side SR of a $\triangle PSR$ such that PQ = PR. Prove that PS > PQ.

15. Two sides AB and BC and median AM of one triangle ABC are respectively equal to sides PQ and QR and median PN of triangle PQR. Show that :$\triangle$ ABM $\cong$ $\triangle$PQN, $\triangle ABC \cong \triangle PQR$



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Solution

1. (b) BC

   Explanation:

   $$\angle A + \angle B + \angle C = 180^\circ$$
   $$\angle A = 45^\circ$$
   $$\angle B = 70^\circ$$
   $$\angle C + 45^\circ + 70^\circ = 180^\circ$$
   $$\angle C + 115^\circ = 180^\circ$$
   $$\angle C = 180^\circ - 115^\circ$$
   $$\angle C = 65^\circ$$

   $\angle A$ is shortest angle and the side opp to shortest angle is shortest

   so BC is the shotest side

2. (c) AC=PQ

   Explanation:

   $\angle A$ is included between AB and AC and $\angle P$ is included between PQ and PR and corresponding sides must be equal . Since AB = PR, hence AC=PQ for the given triangles to be congruent by SAS axiom.

3. (c) ∠CAD

   Explanation:

   As AB = CD, so ,∠ACB = ∠CAD (alternate angles)

4. (d) 120°

   Explanation:

   We know that in equilateral triangle each angle is 60°

and we know sum of interior angle and exterior angle is 180°

let exterior angle be x

$60^\circ + x = 180^\circ$

$x = 180^\circ - 60^\circ$

$x = 120^\circ$

5. (d) AB > AD

   Explanation:

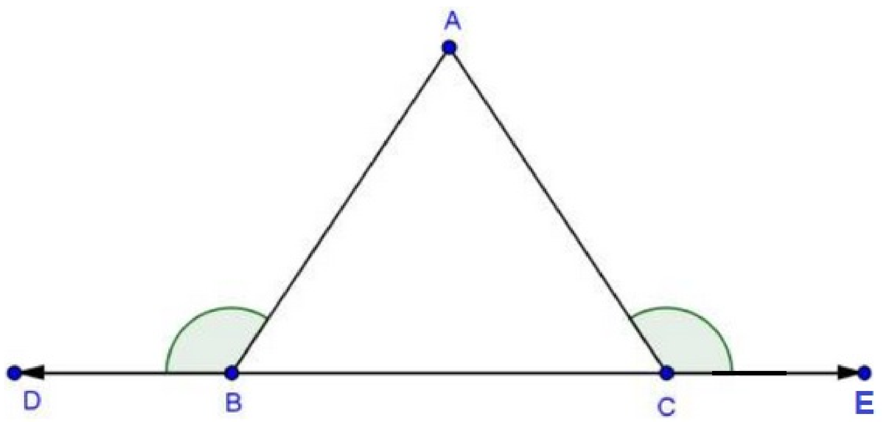
   Angle D = angle C (As AC = AD)

   and angle C > angle B and angle D > angle B

   hence AB > AD

6. twice

7. longer

8. 

   $\angle DBA = \angle ACB + \angle A$ ....(i) [$\because$ Exterior angle = sum of oppsite interior angles]

   $\angle ACE = \angle ABC + \angle A$ ....(ii) [$\because$ Exterior angle = sum of opposite interior angles]

   But $\angle ACB = \angle ABC$ ($\because$ AB = AC)

   $\therefore$ From (i) and (ii)

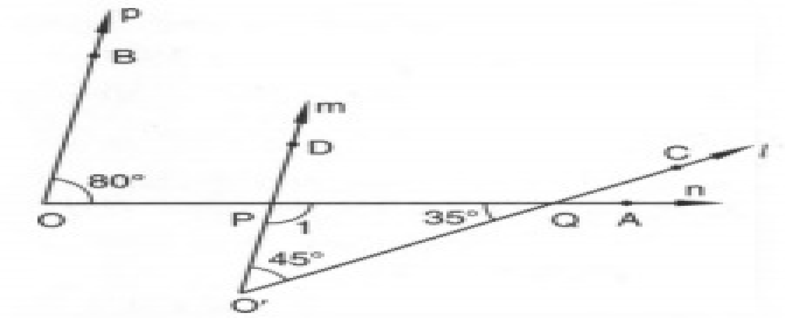
   $\angle DBA = \angle ACE$

9. $(x - 40)^0 + (x - 20)^0 + (\frac{1}{2}x - 10)^0 = 180^0$ ($\because$ sum of all angles of a triangle is equl to 180^0)

   $\Rightarrow \frac{5}{2}x - 70^0 = 180^0$

   $\Rightarrow \frac{5}{2}x = 250^0$

$\Rightarrow x = 100^o$

10. 

Consider $\triangle PO'Q$, we have,

$\angle O'PQ + \angle PO'Q + \angle PQO' = 180°$

$\Rightarrow \angle 1 + 45° + 35° = 180°$

$\Rightarrow \angle 1 = 180° - 80°$

$\Rightarrow \angle 1 = 100°$

Since $\angle QPD$ and $\angle 1$ form a linear pair.

$\therefore \angle QPD + \angle 1 = 180°$

$\Rightarrow \angle QPD + 100° = 180°$

$\Rightarrow \angle QPD = 80°$

Since $\angle BOP = \angle QPD = 80°$ (Corresponding angles are equal)

$\Rightarrow p \parallel m$ [Since p and m are two lines such that a transversal n intersects them at O and P respectively]

Hence proved.

11. In DQPR and DPQS

QR = PS ...[Given]

$\angle RQP = \angle SPQ$ ...[Given]

PQ = PQ ...[Common]

$\therefore$ DQPR $\cong$ DPQS ...[SAS axiom]

$\therefore$ PR = QS ...[c.p.c.t.]

and $\angle QPR = \angle PQS$ ...[c.p.c.t.]

12. In $\triangle ABD$ and $\triangle ACD$

$\angle BAD = \angle CAD$ .... [Given]

$\angle ADB = \angle ADC$ ...... [Each 90^o]

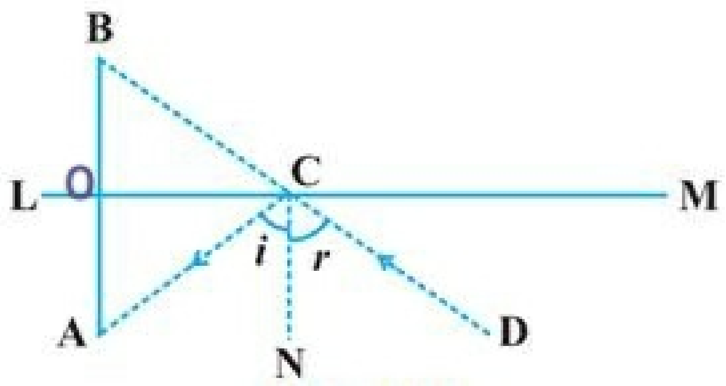
AD = AD .... [Common]

$\therefore \triangle ABC \cong \triangle ACD$ ...... [ASA axiom]

$\triangle$ AB = AC ...... [c.p.c.t.]

Hence, ABC is an isosceles triangle.

13. Let AB intersect LM at O. We have to prove that AO = BO.



Now, $\angle i = \angle r$ ...(1)

[$\because$ Angle of incidence = Angle of reflection]

Since , BA $\|$CN & BD intersects both ,hence

$\angle B = \angle r$ [Corres. $\angle s$] ...(2)

Since , BA $\|$ CN & AC intersects both, hence

$\angle A = \angle i$ [Alternate int. $\angle s$]...(3)

From (1), (2) and (3), we get

$\angle B = \angle A$.........(4)

Also, $\angle BOC = \angle AOC$ (each 90°) ....(5)

Subtracting both sides of equation (5) from 90° , we get :-

90° - $\angle BOC$ = 90° - $\angle AOC$

$\Rightarrow \angle BCO = \angle ACO$ ....(6)

Now, in ΔBOC and ΔAOC we have

$\angle BOC = \angle AOC$ [Each = 90^0]

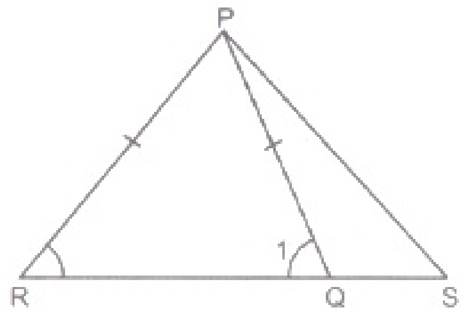
OC = OC[Common side]

$\angle BCO = \angle ACO$ [from (6)]

$\therefore \Delta BOC \cong \Delta AOC$ [ASA congruence rule]

Hence, AO = BO[CPCT]. PROVED.

14. Given: PQ = PR



To prove: PS > PQ

Proof: In $\triangle$PRQ, we have

PR = PQ [Given]

$\Rightarrow \angle 1 = \angle R$

[$\because$ Angles opposite to the equal side of the triangle are equal]

But, $\angle 1 > \angle S$ [$\because$ Exterior angle of a triangle is greater than each of the remote interior angles]

$\Rightarrow \angle R > \angle S$ [$\because \angle 1 = \angle R$]

$\Rightarrow$ PS < PR [$\because$ In a triangle, side opposite to the large is longer]

Hence, proved.

15. Given : Two sides AB and BC and median AM of one triangle ABC are respectively equal to sides PQ and QR and median PN of triangle PQR.

To Prove :

(i)$\triangle ABM \cong \triangle PQN$

(ii) $\Delta\mathrm{ABC} \cong \Delta\mathrm{PQR}$

Proof :

i. In $\triangle$ABM and $\triangle$PQN

AB = PQ . . . [Given] . . . .(1)

AM = PN and BC = QR . . . [Given] . . . (2)

As M and N are the mid-points of BC and QR respectively

2BM = 2QN

BM = QN . . . (3)

According to (1), (2) and (3)

$\Delta ABM \cong \Delta PQN$ . . .[By SSS rule]

ii. $\Delta ABM \cong \Delta PQN$

$\angle ABM \cong \angle PQN$. . . [c.p.c.t.]

$\therefore \angle ABC = \angle PQR$ . . . .(4)

In $\triangle ABC$ and $\triangle PQR$,

AB = PQ and BC = QR . . . [Given]

$\angle ABC = \angle PQR$ . . . [From (4)]

$\therefore \triangle ABC \cong \triangle PQR$ . . .[By SAS]