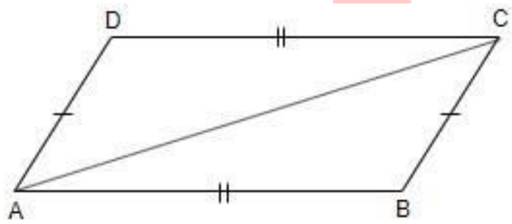
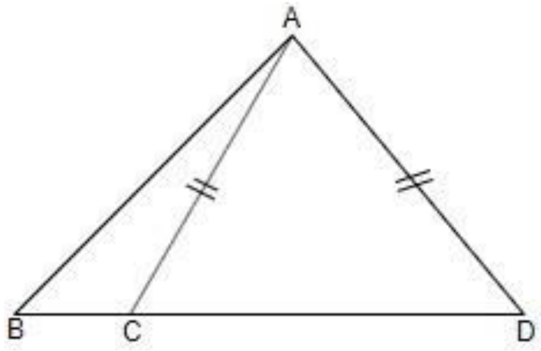
CBSE Test Paper 03

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.

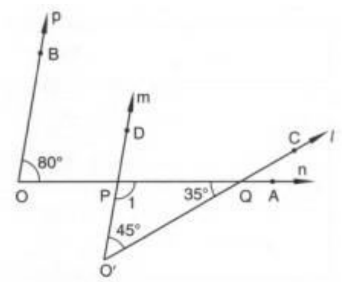
7. Fill in the blanks:

In any triangle, the side opposite to the larger angle is________.

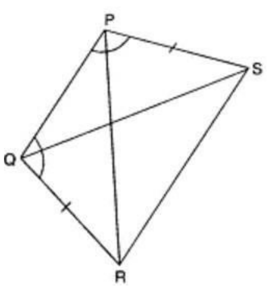
8. If the base of an isosceles triangle is produced on both sides, prove that the exterior angles so formed are equal to each other.

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.

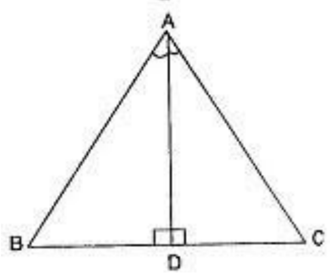
10. In a given figure, prove that p $\parallel$ m.



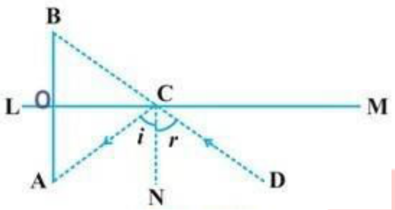
11. In figure, PS = QR and $\angle$SPQ = $\angle$RQP. Prove that PR = QS and $\angle$QPR = $\angle$PQS.



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

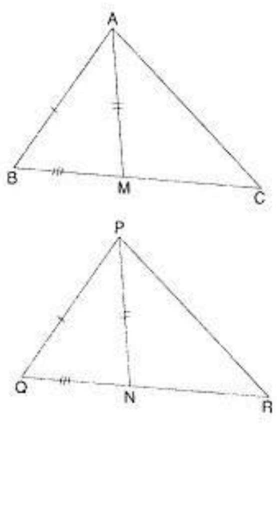


13. The image of an object placed at a point A before a plane mirror LM is seen at point B by an observer at D as shown in the figure. Prove that the image is as far behind the mirror as the object is in front of the mirror.



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 :$\triangle ABM \cong \triangle PQN$, $\triangle ABC \cong \triangle PQR$



CBSE Test Paper 03

CH-7 Triangles

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) $\angle$CAD

   Explanation:

   As $AB = CD$, so ,$\angle$ACB = $\angle$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:

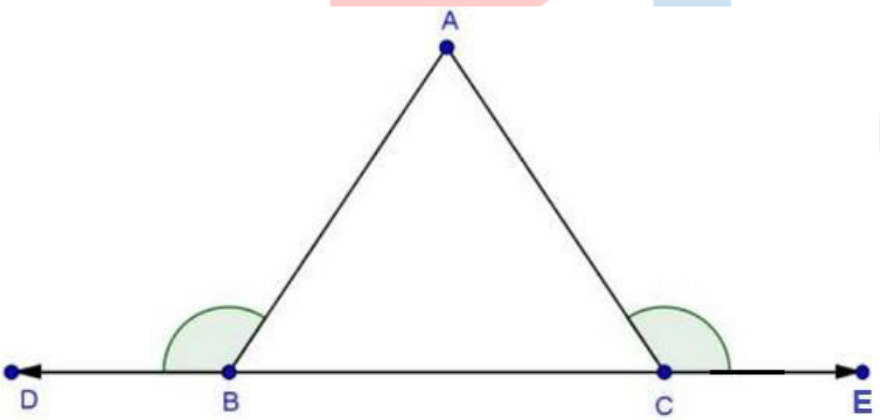
Angle D = angle C (As AC = AD)

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)

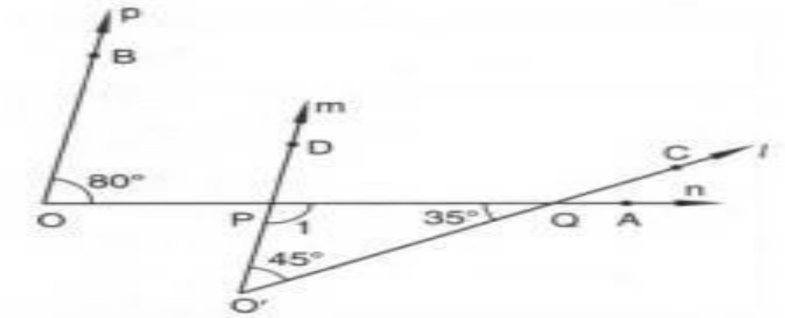
$\angle DBA = \angle ACE$

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

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

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

$\Rightarrow$ 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]

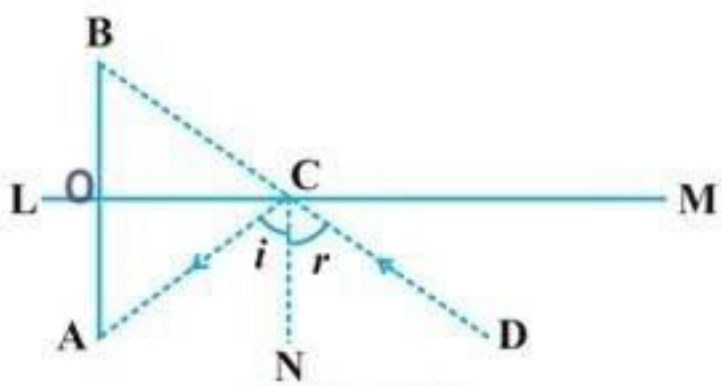
AD = AD ....[Common]

$\therefore \triangle ABC \cong \triangle ACD$ ...... [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)

[∵Angle of incidence = Angle of reflection]

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

$\angle B = \angle r$ [Corres. ∠s](2)

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

$\angle A = \angle i$ [Alternate int. ∠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^o]

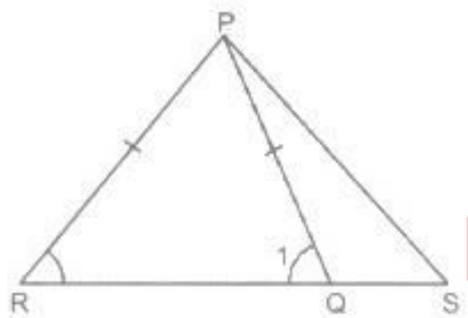
OC = OC[Common side]

$\angle BCO = \angle ACO$ [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]