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NCERT Solutions for 9th Class Maths : Chapter 7 Triangles



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NCERT Solutions for 9th Class Maths : Chapter 7 Triangles

Class 9: Maths Chapter 7 solutions. Complete Class 9 Maths Chapter 7 Notes.

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Exercise 7.1

1. In quadrilateral ACBD, $AC = AD$ and AB bisects $\angle A$ (see Fig. 7.16). Show that $\triangle ABC \cong \triangle ABD$. What can you say about BC and BD ?

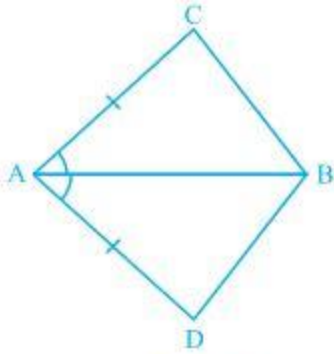


Fig. 7.16

Answer

Given,

$AC = AD$ and AB bisects $\angle A$

To prove,

$\triangle ABC \cong \triangle ABD$

Proof,

In $\triangle ABC$ and $\triangle ABD$,

$AB = AB$ (Common)

$AC = AD$ (Given)

$\angle CAB = \angle DAB$ (AB is bisector)

Therefore, $\triangle ABC \cong \triangle ABD$ by SAS congruence condition.

BC and BD are of equal length.

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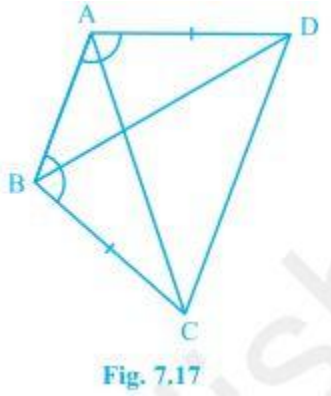
2. ABCD is a quadrilateral in which $AD = BC$ and $\angle DAB = \angle CBA$ (see Fig. 7.17). Prove that

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(i) $\triangle ABD \cong \triangle BAC$

(ii) $BD = AC$

(iii) $\angle ABD = \angle BAC$.



Answer

Given,

$AD = BC$ and $\angle DAB = \angle CBA$

(i) In $\triangle ABD$ and $\triangle BAC$,

$AB = BA$ (Common)

$\angle DAB = \angle CBA$ (Given)

$AD = BC$ (Given)

Therefore, $\triangle ABD \cong \triangle BAC$ by SAS congruence condition.

(ii) Since, $\triangle ABD \cong \triangle BAC$

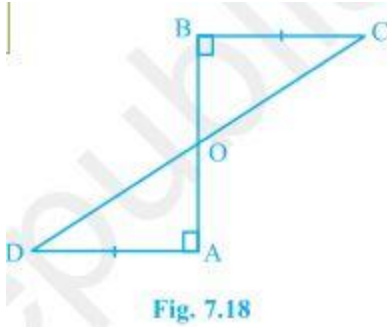
Therefore $BD = AC$ by CPCT

(iii) Since, $\triangle ABD \cong \triangle BAC$

Therefore $\angle ABD = \angle BAC$ by CPCT

3. AD and BC are equal perpendiculars to a line segment AB (see Fig. 7.18). Show that CD bisects AB.

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Answer

Given,

AD and BC are equal perpendiculars to AB.

To prove,

CD bisects AB

Proof,

In $\triangle AOD$ and $\triangle BOC$,

$\angle A = \angle B$ (Perpendicular)

$\angle AOD = \angle BOC$ (Vertically opposite angles)

AD = BC (Given)

Therefore, $\triangle AOD \cong \triangle BOC$ by AAS congruence condition.

Now,

AO = OB (CPCT). CD bisects AB.

4. l and m are two parallel lines intersected by another pair of parallel lines p and q (see Fig. 7.19). Show that $\triangle ABC \cong \triangle CDA$.

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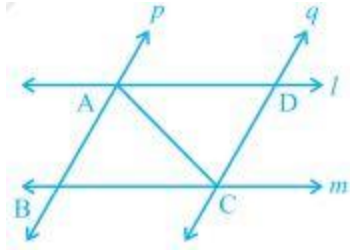


Fig. 7.19

Answer

Given,

$l \parallel m$ and $p \parallel q$

To prove,

$\triangle ABC \cong \triangle CDA$

Proof,

In $\triangle ABC$ and $\triangle CDA$,

$\angle BCA = \angle DAC$ (Alternate interior angles)

$AC = CA$ (Common)

$\angle BAC = \angle DCA$ (Alternate interior angles)

Therefore, $\triangle ABC \cong \triangle CDA$ by ASA congruence condition.

5. Line l is the bisector of an angle $\angle A$ and B is any point on l . BP and BQ are perpendiculars from B to the arms of $\angle A$ (see Fig. 7.20). Show that:

(i) $\triangle APB \cong \triangle AQB$

(ii) $BP = BQ$ or B is equidistant from the arms of $\angle A$.

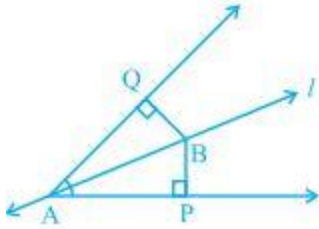


Fig. 7.20

Answer

Given,

AI is the bisector of an angle $\angle A$.

BP and BQ are perpendiculars.

(i) In $\triangle APB$ and $\triangle AQB$,

$\angle P = \angle Q$ (Right angles)

$\angle BAP = \angle BAQ$ (AI is bisector)

$AB = AB$ (Common)

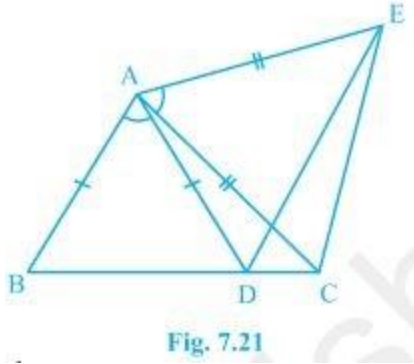
Therefore, $\triangle APB \cong \triangle AQB$ by AAS congruence condition.

(ii) $BP = BQ$ by CPCT. Therefore, B is equidistant from the arms of $\angle A$.

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6. In Fig. 7.21, $AC = AE$, $AB = AD$ and $\angle BAD = \angle EAC$. Show that $BC = DE$.



Answer

Given,

$AC = AE$, $AB = AD$ and $\angle BAD = \angle EAC$

To show,

$BC = DE$

Proof,

$\angle BAD = \angle EAC$ (Adding $\angle DAC$ both sides)

$\angle BAD + \angle DAC = \angle EAC + \angle DAC$

$\Rightarrow \angle BAC = \angle EAD$

In $\triangle ABC$ and $\triangle ADE$,

$AC = AE$ (Given)

$\angle BAC = \angle EAD$

$AB = AD$ (Given)

Therefore, $\triangle ABC \cong \triangle ADE$ by SAS congruence condition.

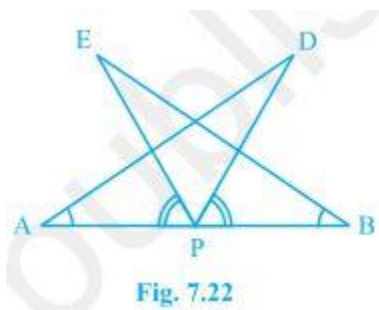
$BC = DE$ by CPCT.

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7. AB is a line segment and P is its mid-point. D and E are points on the same side of AB such that $\angle BAD = \angle ABE$ and $\angle EPA = \angle DPB$ (see Fig. 7.22). Show that

(i) $\triangle DAP \cong \triangle EBP$

(ii) $AD = BE$



Answer

Given,

P is mid-point of AB .

$\angle BAD = \angle ABE$ and $\angle EPA = \angle DPB$

(i) $\angle EPA = \angle DPB$ (Adding $\angle DPE$ both sides)

$\angle EPA + \angle DPE = \angle DPB + \angle DPE$

$\Rightarrow \angle DPA = \angle EPB$

In $\triangle DAP \cong \triangle EBP$,

$\angle DPA = \angle EPB$

$AP = BP$ (P is mid-point of AB)

$\angle BAD = \angle ABE$ (Given)

Therefore, $\triangle DAP \cong \triangle EBP$ by ASA congruence condition.

(ii) $AD = BE$ by CPCT.

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8. In right triangle ABC , right angled at C , M is the mid-point of hypotenuse AB . C is joined to M and produced to a point D such that $DM = CM$. Point D is joined to point B (see Fig. 7.23). Show that:

(i) $\triangle AMC \cong \triangle BMD$

(ii) $\angle DBC$ is a right angle.

(iii) $\triangle DBC \cong \triangle ACB$

(iv) $CM = \frac{1}{2} AB$

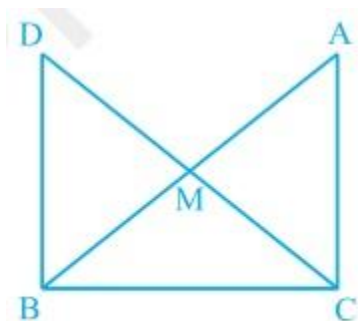


Fig. 7.23

Answer

Given,

$\angle C = 90^\circ$, M is the mid-point of AB and $DM = CM$

(i) In $\triangle AMC$ and $\triangle BMD$,

$AM = BM$ (M is the mid-point)

$\angle CMA = \angle DMB$ (Vertically opposite angles)

$CM = DM$ (Given)

Therefore, $\triangle AMC \cong \triangle BMD$ by SAS congruence condition.

(ii) $\angle ACM = \angle BDM$ (by CPCT)

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Therefore, $AC \parallel BD$ as alternate interior angles are equal.

Now,

$$\angle ACB +$$

$$\angle DBC = 180^\circ \text{ (co-interiors angles)}$$

$$\Rightarrow 90^\circ + \angle B = 180^\circ$$

$$\Rightarrow \angle DBC = 90^\circ$$

(iii) In $\triangle DBC$ and $\triangle ACB$,

$$BC = CB \text{ (Common)}$$

$$\angle ACB = \angle DBC \text{ (Right angles)}$$

$$DB = AC \text{ (by CPCT, already proved)}$$

Therefore, $\triangle DBC \cong \triangle ACB$ by SAS congruence condition.

(iv) $DC = AB$ ($\triangle DBC \cong \triangle ACB$)

$$\Rightarrow DM = CM = AM = BM \text{ (M is mid-point)}$$

$$\Rightarrow DM + CM = AM + BM$$

$$\Rightarrow CM + CM = AB$$

$$\Rightarrow CM = \frac{1}{2}AB$$

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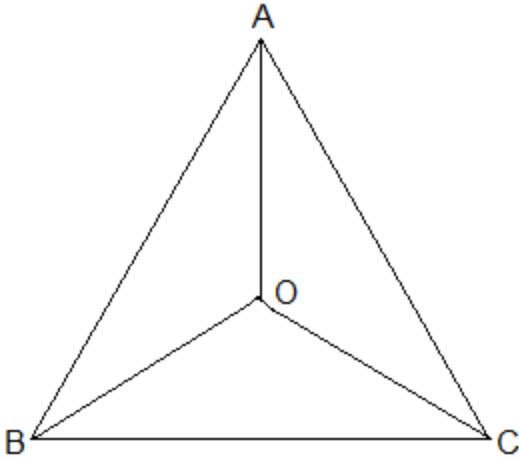
Exercise 7.2

1. In an isosceles triangle ABC, with $AB = AC$, the bisectors of $\angle B$ and $\angle C$ intersect each other at O. Join A to O. Show that :

(i) $OB = OC$

(ii) AO bisects $\angle A$

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Answer

Given,

$AB = AC$, the bisectors of $\angle B$ and $\angle C$ intersect each other at O

(i) Since ABC is an isosceles with $AB = AC$,

$$\therefore \angle B = \angle C$$

$$\Rightarrow \frac{1}{2}\angle B = \frac{1}{2}\angle C$$

$$\Rightarrow \angle OBC = \angle OCB \text{ (Angle bisectors.)}$$

$$\Rightarrow OB = OC \text{ (Side opposite to the equal angles are equal.)}$$

(ii) In $\triangle AOB$ and $\triangle AOC$,

$$AB = AC \text{ (Given)}$$

$$AO = AO \text{ (Common)}$$

$$OB = OC \text{ (Proved above)}$$

Therefore, $\triangle AOB \cong \triangle AOC$ by SSS congruence condition.

$$\angle BAO = \angle CAO \text{ (by CPCT)}$$

Thus, AO bisects $\angle A$.

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2. In $\triangle ABC$, AD is the perpendicular bisector of BC (see Fig. 7.30). Show that $\triangle ABC$ is an isosceles triangle in which $AB = AC$.

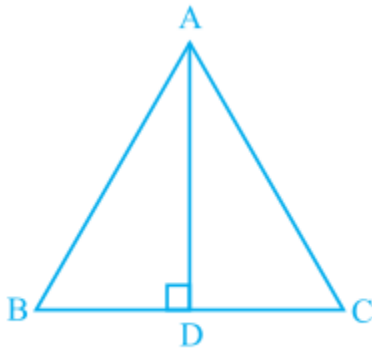


Fig. 7.30

Answer

Given,

AD is the perpendicular bisector of BC

To show,

$AB = AC$

Proof,

In $\triangle ADB$ and $\triangle ADC$,

$AD = AD$ (Common)

$\angle ADB = \angle ADC$

$BD = CD$ (AD is the perpendicular bisector)

Therefore, $\triangle ADB \cong \triangle ADC$ by SAS congruence condition.

$AB = AC$ (by CPCT)

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3. ABC is an isosceles triangle in which altitudes BE and CF are drawn to equal sides AC and AB respectively (see Fig. 7.31). Show that these altitudes are equal.

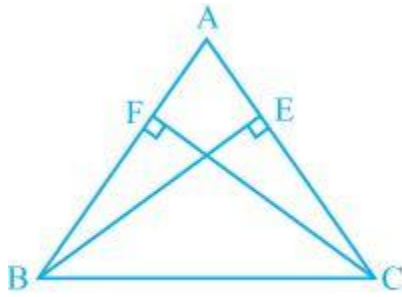


Fig. 7.31

Answer

Given,

BE and CF are altitudes.

$AC = AB$

To show,

$BE = CF$

Proof,

In $\triangle AEB$ and $\triangle AFC$,

$\angle A = \angle A$ (Common)

$\angle AEB = \angle AFC$ (Right angles)

$AB = AC$ (Given)

Therefore, $\triangle AEB \cong \triangle AFC$ by AAS congruence condition.

Thus, $BE = CF$ by CPCT.

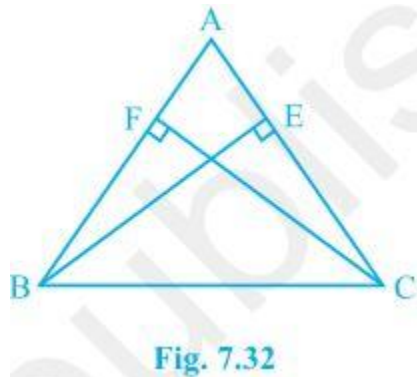
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4. $\triangle ABC$ is a triangle in which altitudes BE and CF to sides AC and AB are equal (see Fig. 7.32). Show that

(i) $\triangle ABE \cong \triangle ACF$

(ii) $AB = AC$, i.e., $\triangle ABC$ is an isosceles triangle.



Answer

Given,

$BE = CF$

(i) In $\triangle ABE$ and $\triangle ACF$,

$\angle A = \angle A$ (Common)

$\angle AEB = \angle AFC$ (Right angles)

$BE = CF$ (Given)

Therefore, $\triangle ABE \cong \triangle ACF$ by AAS congruence condition.

(ii) Thus, $AB = AC$ by CPCT and therefore $\triangle ABC$ is an isosceles triangle.

5. $\triangle ABC$ and $\triangle DBC$ are two isosceles triangles on the same base BC (see Fig. 7.33). Show that $\angle ABD = \angle ACD$.

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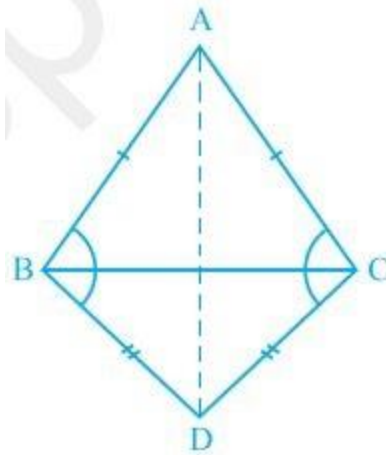


Fig. 7.33

Answer

Given,

ABC and DBC are two isosceles triangles.

To show,

$$\angle ABD = \angle ACD$$

Proof,

In $\triangle ABD$ and $\triangle ACD$,

$$AD = AD \text{ (Common)}$$

$$AB = AC \text{ (ABC is an isosceles triangle.)}$$

$$BD = CD \text{ (BCD is an isosceles triangle.)}$$

Therefore, $\triangle ABD \cong \triangle ACD$ by SSS congruence condition. Thus, $\angle ABD = \angle ACD$ by CPCT.

6. $\triangle ABC$ is an isosceles triangle in which $AB = AC$. Side BA is produced to D such that $AD = AB$ (see Fig. 7.34). Show that $\angle BCD$ is a right angle.

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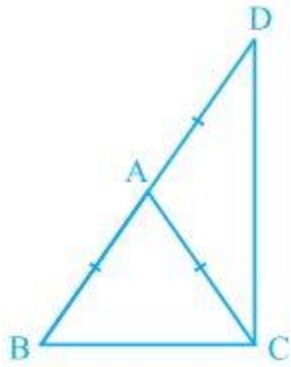


Fig. 7.34

Answer

Given,

$$AB = AC \text{ and } AD = AB$$

To show,

$\angle BCD$ is a right angle.

Proof,

In $\triangle ABC$,

$$AB = AC \text{ (Given)}$$

$$\Rightarrow \angle ACB = \angle ABC \text{ (Angles opposite to the equal sides are equal.)}$$

In $\triangle ACD$,

$$AD = AB$$

$$\Rightarrow \angle ADC = \angle ACD \text{ (Angles opposite to the equal sides are equal.)}$$

Now,

In $\triangle ABC$,

$$\angle CAB + \angle ACB +$$

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$$\angle ABC = 180^\circ$$

$$\Rightarrow \angle CAB + 2\angle ACB = 180^\circ$$

$$\Rightarrow \angle CAB = 180^\circ - 2\angle ACB \text{ --- (i)}$$

Similarly in $\triangle ADC$,

$$\angle CAD = 180^\circ - 2\angle ACD \text{ --- (ii)}$$

also,

$$\angle CAB + \angle CAD = 180^\circ \text{ (BD is a straight line.)}$$

Adding (i) and (ii)

$$\angle CAB + \angle CAD = 180^\circ - 2\angle ACB + 180^\circ - 2\angle ACD$$

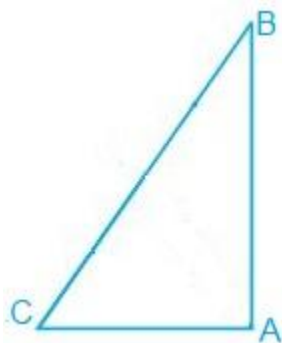
$$\Rightarrow 180^\circ = 360^\circ - 2\angle ACB - 2\angle ACD$$

$$\Rightarrow 2(\angle ACB + \angle ACD) = 180^\circ$$

$$\Rightarrow \angle BCD = 90^\circ$$

7. ABC is a right angled triangle in which $\angle A = 90^\circ$ and $AB = AC$. Find $\angle B$ and $\angle C$.

Answer



Given,

$$\angle A = 90^\circ \text{ and } AB = AC$$

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A/q,

$$AB = AC$$

$\Rightarrow \angle B = \angle C$ (Angles opposite to the equal sides are equal.)

Now,

$$\angle A + \angle B + \angle C = 180^\circ \text{ (Sum of the interior angles of the triangle.)}$$

$$\Rightarrow 90^\circ + 2\angle B = 180^\circ$$

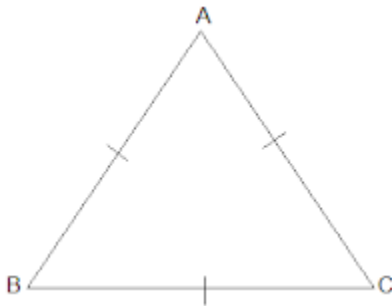
$$\Rightarrow 2\angle B = 90^\circ$$

$$\Rightarrow \angle B = 45^\circ$$

Thus, $\angle B = \angle C = 45^\circ$

8. Show that the angles of an equilateral triangle are 60° each.

Answer



Let ABC be an equilateral triangle.

$$BC = AC = AB \text{ (Length of all sides is same)}$$

$\Rightarrow \angle A = \angle B = \angle C$ (Sides opposite to the equal angles are equal.)

Also,

$$\angle A + \angle B + \angle C = 180^\circ$$

$$\Rightarrow 3\angle A = 180^\circ$$

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$$\Rightarrow \angle A = 60^\circ$$

Therefore, $\angle A = \angle B = \angle C = 60^\circ$

Thus, the angles of an equilateral triangle are 60° each.

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Exercise 7.3

1. $\triangle ABC$ and $\triangle DBC$ are two isosceles triangles on the same base BC and vertices A and D are on the same side of BC (see Fig. 7.39). If AD is extended to intersect BC at P , show that

(i) $\triangle ABD \cong \triangle ACD$

(ii) $\triangle ABP \cong \triangle ACP$

(iii) AP bisects $\angle A$ as well as $\angle D$.

(iv) AP is the perpendicular bisector of BC .

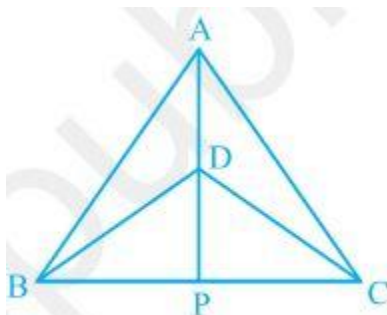


Fig. 7.39

Answer

Given,

$\triangle ABC$ and $\triangle DBC$ are two isosceles triangles.

(i) In $\triangle ABD$ and $\triangle ACD$,

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$AD = AD$ (Common)

$AB = AC$ ($\triangle ABC$ is isosceles)

$BD = CD$ ($\triangle DBC$ is isosceles)

Therefore, $\triangle ABD \cong \triangle ACD$ by SSS congruence condition.

(ii) In $\triangle ABP$ and $\triangle ACP$,

$AP = AP$ (Common)

$\angle PAB = \angle PAC$ ($\triangle ABD \cong \triangle ACD$ so by CPCT)

$AB = AC$ ($\triangle ABC$ is isosceles)

Therefore, $\triangle ABP \cong \triangle ACP$ by SAS congruence condition.

(iii) $\angle PAB = \angle PAC$ by CPCT as $\triangle ABD \cong \triangle ACD$.

AP bisects $\angle A$. --- (i)

also,

In $\triangle BPD$ and $\triangle CPD$,

$PD = PD$ (Common)

$BD = CD$ ($\triangle DBC$ is isosceles.)

$BP = CP$ ($\triangle ABP \cong \triangle ACP$ so by CPCT.)

Therefore, $\triangle BPD \cong \triangle CPD$ by SSS congruence condition.

Thus, $\angle BDP = \angle CDP$ by CPCT. --- (ii)

By (i) and (ii) we can say that AP bisects $\angle A$ as well as $\angle D$.

(iv) $\angle BPD = \angle CPD$ (by CPCT as $\triangle BPD \cong \triangle CPD$)

and $BP = CP$ --- (i)

also,

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$\angle BPD + \angle CPD = 180^\circ$ (BC is a straight line.)

$$\Rightarrow 2\angle BPD = 180^\circ$$

$$\Rightarrow \angle BPD = 90^\circ \text{ ---(ii)}$$

From (i) and (ii),

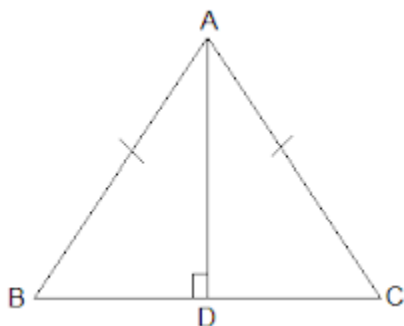
AP is the perpendicular bisector of BC.

2. AD is an altitude of an isosceles triangle ABC in which AB = AC. Show that

(i) AD bisects BC

(ii) AD bisects $\angle A$.

Answer



Given,

AD is an altitude and $AB = AC$

(i) In $\triangle ABD$ and $\triangle ACD$,

$$\angle ADB = \angle ADC = 90^\circ$$

$$AB = AC \text{ (Given)}$$

$$AD = AD \text{ (Common)}$$

Therefore, $\triangle ABD \cong \triangle ACD$ by RHS congruence condition.

Now,

$$BD = CD \text{ (by CPCT)}$$

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Thus, AD bisects BC

(ii) $\angle BAD = \angle CAD$ (by CPCT)

Thus, AD bisects $\angle A$.

3. Two sides AB and BC and median AM of one triangle ABC are respectively equal to sides PQ and QR and median PN of $\triangle PQR$ (see Fig. 7.40). Show that:

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

(ii) $\triangle ABC \cong \triangle PQR$

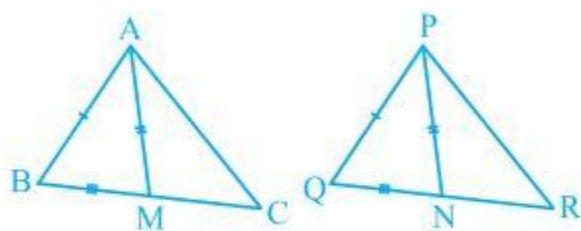


Fig. 7.40

Answer

Given,

$AB = PQ$, $BC = QR$ and $AM = PN$

(i) $\frac{1}{2} BC = BM$ and $\frac{1}{2} QR = QN$ (AM and PN are medians)

also,

$BC = QR$

$\Rightarrow \frac{1}{2} BC = \frac{1}{2} QR$

$\Rightarrow BM = QN$

In $\triangle ABM$ and $\triangle PQN$,

$AM = PN$ (Given)

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$AB = PQ$ (Given)

$BM = QN$ (Proved above)

Therefore, $\triangle ABM \cong \triangle PQN$ by SSS congruence condition.

(ii) In $\triangle ABC$ and $\triangle PQR$,

$AB = PQ$ (Given)

$\angle ABC = \angle PQR$ (by CPCT)

$BC = QR$ (Given)

Therefore, $\triangle ABC \cong \triangle PQR$ by SAS congruence condition.

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4. BE and CF are two equal altitudes of a triangle ABC. Using RHS congruence rule, prove that the triangle ABC is isosceles.

Answer

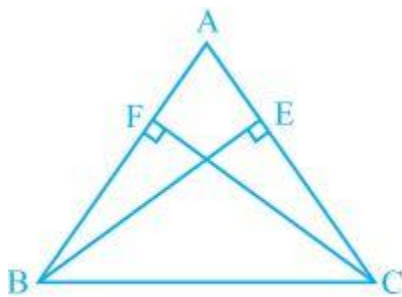


Fig. 7.31

Given,

BE and CF are two equal altitudes.

In $\triangle BEC$ and $\triangle CFB$,

$\angle BEC = \angle CFB = 90^\circ$ (Altitudes)

$BC = CB$ (Common)

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$BE = CF$ (Common)

Therefore, $\triangle BEC \cong \triangle CFB$ by RHS congruence condition.

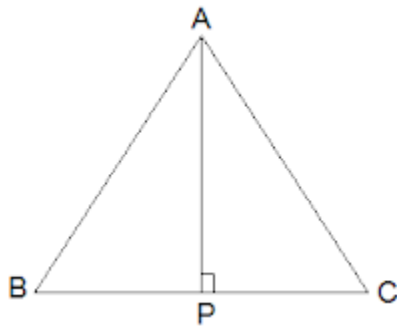
Now,

$\angle C = \angle B$ (by CPCT)

Thus, $AB = AC$ as sides opposite to the equal angles are equal.

5. ABC is an isosceles triangle with $AB = AC$. Draw $AP \perp BC$ to show that $\angle B = \angle C$.

Answer



Given,

$AB = AC$

In $\triangle ABP$ and $\triangle ACP$,

$\angle APB = \angle APC = 90^\circ$ (AP is altitude)

$AB = AC$ (Given)

$AP = AP$ (Common)

Therefore, $\triangle ABP \cong \triangle ACP$ by RHS congruence condition.

Thus, $\angle B = \angle C$ (by CPCT)

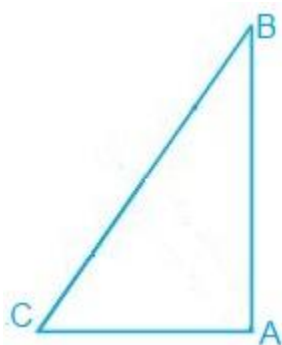
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Exercise 7.4

1. Show that in a right angled triangle, the hypotenuse is the longest side.

Answer



ABC is a triangle right angled at B.

Now,

$$\angle A +$$

$$\angle B +$$

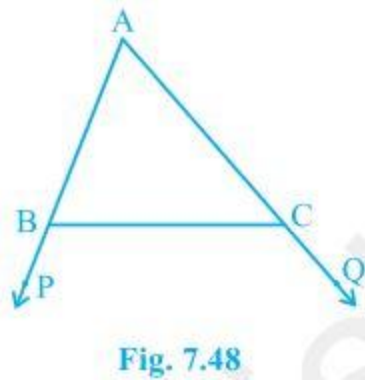
$$\angle C = 180^\circ$$

$$\Rightarrow \angle A + \angle C = 90^\circ \text{ and } \angle B \text{ is } 90^\circ.$$

Since, B is the largest angle of the triangle, the side opposite to it must be the largest.

So, BC is the hypotenuse which is the largest side of the right angled triangle ABC.

2. In Fig. 7.48, sides AB and AC of ΔABC are extended to points P and Q respectively. Also, $\angle PBC < \angle QCB$. Show that $AC > AB$.

**Answer**

Given,

$$\angle PBC < \angle QCB$$

Now,

$$\angle ABC + \angle PBC = 180^\circ$$

$$\Rightarrow \angle ABC = 180^\circ - \angle PBC$$

also,

$$\angle ACB + \angle QCB = 180^\circ$$

$$\Rightarrow \angle ACB = 180^\circ - \angle QCB$$

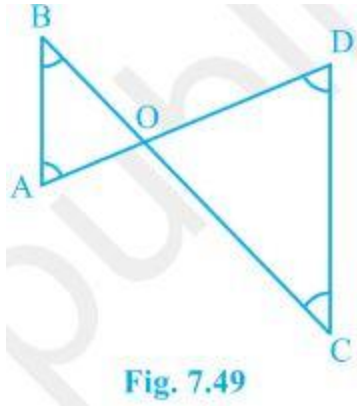
Since,

$$\angle PBC < \angle QCB \text{ therefore, } \angle ABC > \angle ACB$$

Thus, $AC > AB$ as sides opposite to the larger angle is larger.

3. In Fig. 7.49, $\angle B < \angle A$ and $\angle C < \angle D$. Show that $AD < BC$.

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Answer

Given,

$$\angle B < \angle A \text{ and } \angle C < \angle D$$

Now,

$$AO < BO \text{ --- (i) (Side opposite to the smaller angle is smaller)}$$

$$OD < OC \text{ ---(ii) (Side opposite to the smaller angle is smaller)}$$

Adding (i) and (ii)

$$AO + OD < BO + OC$$

$$\Rightarrow AD < BC$$

4. AB and CD are respectively the smallest and longest sides of a quadrilateral ABCD (see Fig. 7.50).

Show that $\angle A > \angle C$ and $\angle B > \angle D$.

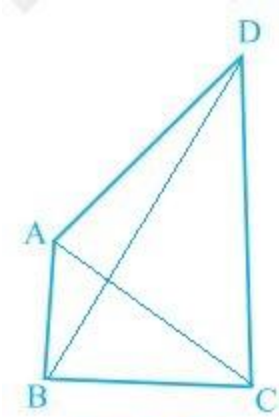


Fig. 7.50

Answer

In $\triangle ABD$,

$$AB < AD < BD$$

$\therefore \angle ADB < \angle ABD$ --- (i) (Angle opposite to longer side is larger.)

Now,

In $\triangle BCD$,

$$BC < DC < BD$$

$\therefore \angle BDC < \angle CBD$ --- (ii)

Adding (i) and (ii) we get,

$$\angle ADB + \angle BDC < \angle ABD + \angle CBD$$

$$\Rightarrow \angle ADC < \angle ABC$$

$$\Rightarrow \angle B > \angle D$$

Similarly,

In $\triangle ABC$,

$\angle ACB < \angle BAC$ --- (iii) (Angle opposite to longer side is larger.)

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Now,

In $\triangle ADC$,

$$\angle DCA < \angle DAC \text{ --- (iv)}$$

Adding (iii) and (iv) we get,

$$\angle ACB + \angle DCA < \angle BAC + \angle DAC$$

$$\Rightarrow \angle BCD < \angle BAD$$

$$\Rightarrow \angle A > \angle C$$

5. In Fig 7.51, $PR > PQ$ and PS bisects $\angle QPR$. Prove that $\angle PSR > \angle PSQ$.

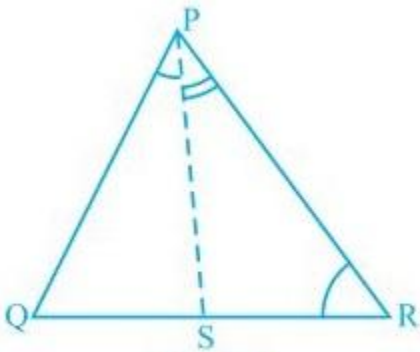


Fig. 7.51

Answer

Given,

$PR > PQ$ and PS bisects $\angle QPR$

To prove,

$$\angle PSR > \angle PSQ$$

Proof,

$$\angle PQR > \angle PRQ \text{ --- (i) (PR > PQ as angle opposite to larger side is larger.)}$$

$$\angle QPS = \angle RPS \text{ --- (ii) (PS bisects } \angle QPR)$$

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$$\angle PSR = \angle PQR +$$

$\angle QPS$ --- (iii) (exterior angle of a triangle equals to the sum of opposite interior angles)

$\angle PSQ = \angle PRQ + \angle RPS$ --- (iv) (exterior angle of a triangle equals to the sum of opposite interior angles)

Adding (i) and (ii)

$$\angle PQR + \angle QPS > \angle PRQ + \angle RPS$$

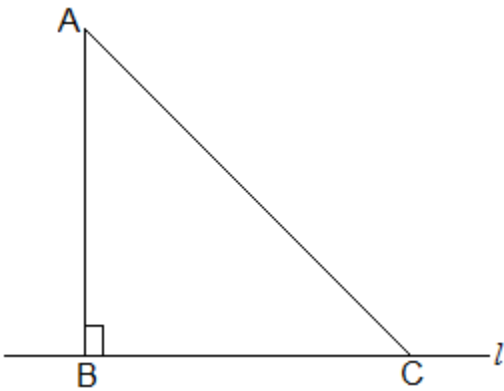
$$\Rightarrow \angle PSR > \angle PSQ \text{ [from (i), (ii), (iii) and (iv)]}$$

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6. Show that of all line segments drawn from a given point not on it, the perpendicular line segment is the shortest.

Answer



Let l is a line segment and B is a point lying on it. We drew a line AB perpendicular to l . Let C be any other point on l .

To prove,

$$AB < AC$$

Proof,

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In $\triangle ABC$,

$$\angle B = 90^\circ$$

Now,

$$\angle A +$$

$$\angle B +$$

$$\angle C = 180^\circ$$

$$\Rightarrow \angle A + \angle C = 90^\circ$$

$\therefore \angle C$ must be acute angle. or $\angle C < \angle B$

$\Rightarrow AB < AC$ (Side opposite to the larger angle is larger.)

Chapter 7 Triangles NCERT Solutions which will be helpful in revising the important theorems and topics. A closed figure formed by three intersecting lines is called a triangle. We will be studying the congruence of triangles, rules of congruence, some more properties of triangles and inequalities in a triangle.

- Congruence of Triangles: Two congruent figures have exactly the same shape and size. In congruent triangles corresponding parts are equal and we write in short 'CPCT' for corresponding parts of congruent triangles.

- Criteria for Congruence of Triangles:

SAS congruence rule- Two triangles are congruent if two sides and the included angle of one triangle are equal to the two sides and the included angle of the other triangle.

ASA congruence rule- Two triangles are congruent if two angles and the included side of one triangle are equal to two angles and the included side of other triangle. Two triangles are congruent if any two pairs of angles and one pair of corresponding sides are equal. This is called the AAS Congruence Rule.

- Some Properties of a Triangle: Angles opposite to equal sides of an isosceles triangle are equal and the converse is the sides opposite to equal angles of a triangle are equal.

- Some More Criteria for Congruence of Triangles:

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SSS congruence rule- If three sides of one triangle are equal to the three sides of another triangle, then the two triangles are congruent.

RHS congruence rule- If in two right triangles the hypotenuse and one side of one triangle are equal to the hypotenuse and one side of the other triangle, then the two triangles are congruent.

• Inequalities in a Triangle:

(i) If two sides of a triangle are unequal, the angle opposite to the longer side is larger (or greater).

(ii) In any triangle, the side opposite to the larger (greater) angle is longer.

(iii) The sum of any two sides of a triangle is greater than the third side.

There are total five exercises in which last one is optional. These **Chapter 7 NCERT Solutions** will increase your understanding of Triangles and will increase concentration among students. Below we have provided exercisewise NCERT Solutions which you can check.

Our subject matter experts have prepared these NCERT Solutions through which one can clear their doubts and understand them easily.

NCERT Solutions for Class 9 Maths Chapters:

FAQ on Chapter 7 Triangles

How many exercises in Chapter 7 Triangles?

Chapter 7 Triangles consists of total five exercises however one is optional not useful for the purpose of exams but will check your in depth knowledge. Here Indcareer Schools experts have provided accurate and detailed solutions of every question.

Each of the equal angles of an isosceles triangle is 38° , what is the measure of the third angle?

Let the third angle = x

$$\therefore x + 38^\circ + 38^\circ = 180^\circ$$

$$\Rightarrow x = 180^\circ - 38^\circ - 38^\circ$$

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$$= 104^\circ$$

Find the measure of each of acute angle in a right angle isosceles triangle.

Let the measure of each of the equal acute angle of the Δ be x

$$\therefore \text{We have: } x + x + 90^\circ = 180^\circ$$

$$\Rightarrow x + x = 180^\circ - 90^\circ = 90^\circ$$

$$\Rightarrow x = (90^\circ/2) = 45^\circ$$

If two angles are $(30 - a)^\circ$ and $(125 + 2a)^\circ$ and they are supplement of each other. Find the value of 'a'.

$(30 - a)^\circ$ and $(125 + 2a)^\circ$ are supplement to each other.

$$\therefore (30 - a + 125 + 2a)^\circ = 180^\circ$$

$$\Rightarrow a = 180^\circ - 125^\circ - 30^\circ = 25^\circ$$

$$\Rightarrow \text{Value of } a = 25^\circ$$

NCERT 9th Maths Chapter 7, class 9 Maths Chapter 7 solutions



Chapterwise NCERT Solutions for Class 9 Maths :

- Chapter 1 Number System
- Chapter 2 Polynomials
- Chapter 3 Coordinate Geometry
- Chapter 4 Linear Equations in Two Variables
- Chapter 5 Introduction to Euclid's Geometry
- Chapter 6 Lines and Angles
- Chapter 7 Triangles
- Chapter 8 Quadrilaterals
- Chapter 9 Areas of Parallelograms and Triangles
- Chapter 10 Circles
- Chapter 11 Constructions
- Chapter 12 Heron's Formula
- Chapter 13 Surface Areas and Volumes
- Chapter 14 Statistics
- Chapter 15 Probability

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