MATHS

NCERT - NCERT MATHEMATICS(TAMIL ENGLISH)

TRIANGLES

Examples

1. In the given Figure AB and CD are intersecting at 'O', OA = OB and OD = OC. Show that (i) $\Delta AOD \cong \Delta BOC$ and (ii) $AD \mid\mid BC$.

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2. AB is a line segment and line l is its perpendicular bisector. If a point P lies on l, show that P is equidistant from A and B.

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3. In the given figure, A B | | D C and A D | | B C show that Δ A B C $\cong$ Δ C D A .

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4. In the given figure, AL || DC, E is mid point of BC. Show that $\Delta EBL \cong \Delta ECD$.

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5. Use the information given in the adjoining figure, to prove :

$(i) \Delta DBC \cong \Delta EAC$

$(ii) DC = EC.$

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6. Line-segment AB is parallel to another line-segment CD. O is the mid-point of AD.

Show that (i) $\Delta AOB \cong \Delta DOC$ (ii) O is also the mid-point of BC.

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7. In ΔABC, the bisector AD of A is perpendicular to side BC Show that AB = AC and ΔABC is isosceles.

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8. In the adjacent figure, $AB = BC$ and $AC = CD$.

Prove that : $\angle BAD : \angle ADB = 3 : 1$.

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9. In the given figure, AD is perpendicular to BC and EF || BC, if $\angle EAB = \angle FAC$, show that triangles ABD and ACD are congruent.

Also, find the values of x and y if $AB = 2x + 3, AC = 3y + 1, BD = x$ and $DC = y + 1$.

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10. E and F are respectively the mid-points of equal sides AB and AC of ΔABC (see figure)

Show that BF = CE.

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11. In an isosceles triangle ABC with AB = AC, D and E are points on BC such that BE = CD (see figure) Show that AD = AE

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12. In quadrilateral ABCD, AB = CD, BC=AD show that $\Delta ABC \cong \Delta CDA$ Consider ΔABC and ΔCDA

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13. AB is a line - segment. P and Q are points on either side of AB such that each of them is equidistant from the points A and B (See Fig). Show that the line PQ is the perpendicular bisector of AB.

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14. P is a point equidistant from two lines l and m intersecting at point A (see figure). Show that the line AP bisects the angle between them.

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15. D is a point on side BC ΔABC such that AD = AC (see figure). Show that AB > AD.

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Do This

1. There are some statements given below. Write whether they are true or false :

Two circle are always congruent.

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2. There are some statements given below. Write whether they are true or false :

Two line segments of same length are always congruent.

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3. There are some statements given below. Write whether they are true or false :

Two right angle triangles are sometimes congruent.

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4. There are some statements given below. Write whether they are true or false :

Two equilateral triangles with their sides equal are always congruent.

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5. Which minimum measurements do you require to check if the given figures are congruent:

i. Two rectangles ii. Two rhombuses.

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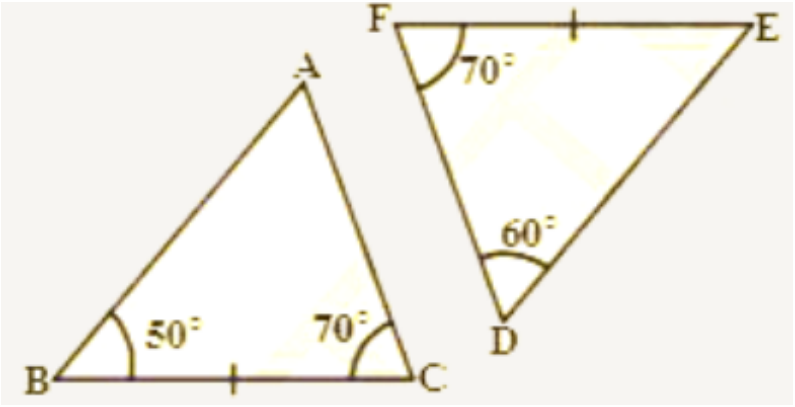
6. State whether the following triangles are congruent or not? Give reasons for your answer.



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7. State whether the following triangles are congruent or not? Give reasons for your answer.

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8. In the given figure, the point P bisects AB and DC. Prove that

$\Delta APC \cong \Delta BPD$

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9. In the adjacent figure ΔABC and ΔDBC are two triangles such that $\overline{AB} = \overline{BD}$ and $\overline{AC} = \overline{CD}$. Show that $\Delta ABC \cong \Delta DBC$.

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10. Now draw a triangle ABC and measure its sides. Find the sum of the sides AB + BC, BC + AC and AC + AB, compare it with the length of the third side. What do you observe?

You will observe that AB + BC > AC, BC + AC > AB and AC + AB > BC.

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Exercise 7 1

1. In quadrilateral $ACBD$, $AC = AD$ and AB bisects $\angle A$ Show that $\Delta ABC \cong \Delta ABD$.

What can you say about BC and BD?

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2. ABCD is a quadrilateral in which AD = BC and $\angle DAB = \angle CBA$ Prove that

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

(ii) $BD = AC$

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

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3. AD and BC are equal and perpendiculars to a line segment AB. Show that CD bisects AB.

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4. l and m are two parallel lines intersected by another pair of parallel lines p and q . Show that

$\Delta ABC \cong \Delta CDA.$

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5. In the adjacent figure, $AC = AE, AB = AD$ and $\angle BAD = \angle EAC.$ Show that BC = DE.

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6. In right triangle ABC, right angle is 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 figure). Show that :

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

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

$(iii)\Delta DBC \cong \Delta ACB$ (iv)$CM = \frac{1}{2}AB.$

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7. In the adjacent figure ABCD is a square and ΔAPB is an equilateral triangle. Prove that$\Delta APD \cong \Delta BPC.$

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8. In the adjacent figure ΔABC is isosceles as $\overline{AB} = \overline{AC}$, $\overline{BA}$ and $\overline{CA}$ are produced to Q and P such that $\overline{AQ} = \overline{AP}$.. Show that $\overline{PB} = \overline{QC}$.

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9. In the adjacent figure ΔABC, D is the midpoint of BC. $DE \perp AB$, $DF \perp AC$ and $DE = DF$. Show that $\Delta BED \cong \Delta CFD$.

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10. If the bisector of an angle of a triangle also bisects the opposite side, prove that the triangle is isosceles.

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11. In the given figure ABC is a right triangle and right angled at B such that $\angle BCA = 2\angle BAC$.

Show that hypotenuse AC = 2BC.

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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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2. In ΔABC, the bisector AD of A is perpendicular to side BC Show that AB = AC and ΔABC is isosceles.

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3. ABC is an isosceles triangle in which altitudes BD and CE are drawn to equal sides AC and AB respectively (see figure) Show that these altitudes are equal.

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4. ABC is a triangle in which altitudes BD and CE to sides AC and AB are equal (see figure) . Show that

$(i) \Delta ABD \cong \Delta ACE$

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

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5. ΔABC and ΔDBC are two isosceles triangles on thesame base BC (see figure). Show that $\angle ABD = \angle ACD$.

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Exercise 7 3

1. AD is an altitude of an isosceles triangle ABC in which AB = AC. Show that, (i) AD bisects BC (ii) AD bisects $\angle A$.

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2. Two sides AB, BC and median AM of one triangle ABC are respectively equal to sides PQ and QR and median PN of ΔPQR (See figure). Show that:

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

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

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

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4. ΔABC is an isosceles triangle in which AB = AC. Show that $\angle B = \angle C$.

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

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

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

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Exercise 7 4

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

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

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

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4. AB and CD are respectively the smallest and longest sides of aquadrilateral ABCD (see adjacent figure). Show that $\angle A > \angle C$ and $\angle B > \angle D$.

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

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6. If two sides of a triangle measure 4 cm and 6 cm find all possible measurements (positive Integers) of the third side. How many distinct triangles can be obtained?

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7. Try to construct a triangle with 5 cm, 8 cm and 1 cm. Is it possible or not ? Why ? Give your justification?

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