EXERCISE 7.1 - Question No. 1

In quadrilateral ACBD, $AC = AD$ and AB bisects $\angle A$ (see Fig. 7.16). Show that $\Delta ABC \cong \Delta ABD$

EXERCISE 7.1 - Question No. 2

ABCD is a quadrilateral in which and$\angle DAB = \angle CBA$ (see Fig. 7.17). Prove that (i) $\Delta ABD \cong \Delta BAC$ (ii) $BD = AC$ (iii) $\angle ABD = \angle BAC$

EXERCISE 7.1 - Question No. 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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EXERCISE 7.1 - Question No. 4

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

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EXERCISE 7.1 - Question No. 5

line l is the bisector of an angle $\angle A$ $and \angle B$ is any point on l. BP and BQ are perpendiculars from B to the arms of $\angle A$. Show that: (i) $\Delta APB \cong \Delta AQB$ (ii) BP = BQ or B is equidistant from the arms of $\angle A$

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EXERCISE 7.1 - Question No. 6

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

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EXERCISE 7.1 - Question No. 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) $\Delta DAP \cong \Delta EBP$ (ii) $AD = BE$

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EXERCISE 7.1 - Question No. 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) $\Delta AMC \cong \Delta BMD$ (ii) `/_

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EXERCISE 7.2 - Question No. 1

In an isosceles triangle ABC, with AB = A C

, $thebi\sec \to rsofB$ and $C\int er\sec teachotheratO.\ Jo \in A \to O.\ Showt\hat{?}\ (i)$ O B = O C` (ii) AO bisects A

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EXERCISE 7.2 - Question No. 2

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

EXERCISE 7.2 - Question No. 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.

EXERCISE 7.2 - Question No. 4

ABC is a triangle in which altitudes BE and CF to sides AC and AB are equal (see Fig. 7.32). Show that (i) $\Delta ABE \cong \Delta ACF$ (ii) $AB = AC$, i.e., ABC is an isosceles triangle

EXERCISE 7.2 - Question No. 5

ABC and DBC are two isosceles triangles on the same base BC (see Fig. 7.33).

Show that $\angle ABD = \angle ACD$

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EXERCISE 7.2 - Question No. 6

DABC 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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EXERCISE 7.2 - Question No. 7

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

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EXERCISE 7.2 - Question No. 8

Show that the angles of an equilateral triangle are $60o$ each.

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EXERCISE 7.3 - Question No. 1

ΔABC and ΔDBC 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) $\Delta ABD \cong \Delta ACD$ (ii) `DeltaA B P~=Delta

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EXERCISE 7.3 - Question No. 2

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

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EXERCISE 7.3 - Question No. 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 $\Delta ABC \cong \Delta PQR$ (see Fig. 7.40). Show that: (i) $\Delta ABM \cong \Delta PQN$ (ii) $\Delta ABC \cong \Delta PQR$

EXERCISE 7.3 - Question No. 4

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

EXERCISE 7.3 - Question No. 5

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

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EXERCISE 7.4 - Question No. 1

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

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EXERCISE 7.4 - Question No. 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 $AC > AB$.

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EXERCISE 7.4 - Question No. 3

In Fig. 7.49, $\angle B < ! - -_A$ and $\angle C < \angle D$. Show that $AD < BC$. lt /b-rarr

EXERCISE 7.4 - Question No. 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 $\angle B > \angle D$.

EXERCISE 7.4 - Question No. 5

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

EXERCISE 7.4 - Question No. 6

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

EXERCISE 7.5 - Question No. 1

ABC is a triangle. Locate a point in the interior of ΔABC which is equidistant from all the vertices of ΔABC

EXERCISE 7.5 - Question No. 2

In a triangle locate a point in its interior which is equidistant from all the sides of the triangle

EXERCISE 7.5 - Question No. 3

In a huge park, people are concentrated at three points (see Fig. 7.52): A : where there are different slides and swings for children, B : near which a man-made lake is situated, C : which is near to a large parking and exit. Where should an icecream parlour be set up so that maximum number of persons can approach it? (Hint : The parlour should be equidistant from A, B and C)

EXERCISE 7.5 - Question No. 4

Complete the hexagonal and star shaped Rangolies [see Fig. 7.53 (i) and (ii)] by filling them with as many equilateral triangles of side 1 cm as you can. Count the number of triangles in each case. Which has more triangles?

SOLVED EXAMPLES - Question No. 1

In Fig. 7.8, $OA = OB \text{ and } OD = OC$. Show that (i)

$(ii)(iii)\Delta AOD \cong \Delta BOC(iv)$ (v) and (ii) $(vi)(vii)AD \mid\mid BC(viii)$ (ix)

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SOLVED EXAMPLES - Question No. 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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SOLVED EXAMPLES - Question No. 3

Line-segment AB is parallel to another line-segment CD. O is the mid-point of AD (see Fig. 7.15). Show that (i) $\Delta AOB \cong \Delta DOC$ (ii) O is also the mid-point of BC

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SOLVED EXAMPLES - Question No. 4

In $\bigwedge$ ABC, the bisector AD of A is perpendicular to side BC (see Fig. 7.27).

Show that $AB = AC$ and ΔABC is isosceles

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SOLVED EXAMPLES - Question No. 5

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

Fig. 7.28). Show that BF = C E` .

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SOLVED EXAMPLES - Question No. 6

In an isosceles triangle ABC with $AB = AC$, D and E are points on BC such

that $BE = CD$ (see Fig. 7.29). Show that $AD = AE$

SOLVED EXAMPLES - Question No. 7

AB is a line-segment. P and Q are points on opposite sides of AB such that each of them is equidistant from the points A and B (see Fig. 7.37). Show that the line PQ is the perpendicular bisector of AB

SOLVED EXAMPLES - Question No. 8

P is a point equidistant from two lines l and m intersecting at point A (see Fig. 7.38). Show that the line AP bisects the angle between them.

SOLVED EXAMPLES - Question No. 9

D is a point on side BC of ΔABC such that $AD = AC$ (see Fig. 7.47).Show that $AB > AD$.