CHAPTER-7

Triangles

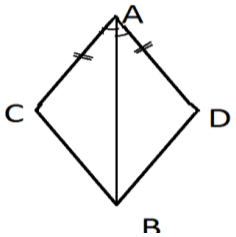
QUESTION BANK

(1) Which of the following is not a criterion for congruence of triangles?

(a) SAS (b) ASA

(c) SSA (d) SSS

(2) In the given figure, the congruence rule used in proving ΔACB = ΔADB is



(a) ASS (b) SAS

(c) AAS (d) RHS

(3) IF AB = QR, BC = PR and CA = PQ then

(a) Δ ABC = ΔPQR (b) Δ CBA = ΔPRQ

(b) Δ BAC = Δ RPQ (d) ΔPQR = ΔBCA

(4) If ΔABC = Δ PQR and Δ ABC is not congruent to ΔRPQ, then which of the following is not true:

(a) BC = PQ (b) AC = PR

(c) QR = BC (d) AB = PQ

(5) In triangles ABC and DEF, AB = FD and ∠A = ∠D. The two triangles will be congruent by SAS axiom if

(a) BC = EF (b) AC = DE

(b) AC = EF (d) BC = DF

(6) If Δ ABC = Δ DEF, AB = DE and BC = EF, then the necessary condition for congruency is

(a) ∠A = ∠D (b) ∠B= ∠E

(c) ∠C = ∠F (d) CA = DE

(7) In triangles ABC and DEF, AB = AC, ∠C = ∠D and ∠B = ∠E. The two triangles are

(a) isosceles and congruent

(b) isosceles but not congruent

(c) congruent but not isosceles

(d) neither isosceles nor congruent

(8) In two triangles ABC and DEF, AB = DE and AC = EF. The two angles from the two triangles that must be equal to make the two triangles congruent are

(a) ∠A and ∠D (b) ∠A and ∠F

(c) $\angle B$ and $\angle E$ (d) $\angle A$ and $\angle E$

(9) In triangles ABC and PQR, if $\angle A = \angle R$, $\angle B = \angle P$ and AB= RP, then which one of the following congruency criteria can be used?

(a) SAS (b) ASA

(c) SSS (d) RHS

(10) In triangles ABC and PQR, AB = QP, $\angle B = \angle P$ and BC= QR. The two triangles will be congruent by axiom

(a) SAS (b) ASA

(c) SSS (d) RHS

(11) In Δ ABC, AB = AC and $\angle B = 50^0$. Then $\angle C$ is equal to

(a) 40^0 (b) 50^0 (c) 80^0 (d) 130^0

(12) In ΔPQR, $\angle R = \angle P$ and QR=4 cm and PR = 5 cm. Then the length of PQ is

(a) 4cm (b) 5 cm. (c) 2 cm. (d) 2.5 cm.

(13) D is a point on the side BC of a Δ ABC such that AD bisects $\angle BAC$. Then

(a) BD=CD (b) BA > BD

(c) BD > BA (d) CD > CA

(14) Two sides of a triangle are of lengths 5 cm and 1.5 cm. The length of the third side of the triangle cannot be

(a) 3.6 cm (b) 4.1 cm. (c) 3.8 cm (d) 3.4 cm.

(15) In ΔPQR, if $\angle R > \angle Q$ then

(a) QR > PR (b) PQ > PR

(c) PQ < PR (d) QR < PR

(16) In Δ ABC, the altitude AD, BE and CF are equal. Then Δ ABC is

(a) an acute angled triangle

(b) a right angled triangle

(c) a right angled isosceles triangle

(d) an equilateral triangle

(17) If Δ ABC is an isosceles triangle, then which of the following is not true.

(a) bisector of $\angle BAC \perp$ BC

(b) altitude AD bisects $\angle BAC$

(c) altitude BE = altitude CF

(d) all the three altitudes are equal

(18) It is given that $\Delta ABC = \Delta FDE$ and AB = 5 cm, $\angle B = 40^0$ and $\angle A = \angle 80^0$. Then which of the following is true?

(a) DF = 5 cm, $\angle F = 60^0$ (b) DF = 5 cm, $\angle E = 60^0$

(c) DE = 5 cm, $\angle E = 80^0$ (d) DE = 5cm, $\angle D = 40^0$

(19) If D, E and F are the mid-points of the sides BC, CA and AB respectively of ΔABC, then ΔDEF is congruent to

(a) ΔABC (b) ΔAEF

(c) $\Delta BFD, \Delta CDE$ (d) $\Delta AFE, \Delta FBD, \Delta EDC$

(20) In ΔABC, BC = AB and $\angle B = 80^0$. Then $\angle A$ is equal to

(a) 80^0 (b) 40^0 (c) 50^0 (d) 100^0

(21) Two figures are congruent, if they are of the same _____ and of the same_____.

(22) Two circles are congruent if their _____ are equal.

(23) Two lines segments are congruent, if their _____are equal.

(24) Sides opposite to equal sides of a triangle are _____.

(25) Each angle of an equilateral triangle is of _____.

(26) In a Δ ABC, if $\angle A = \angle C$, then AB = _____.

(27) In right triangles ABC and DEF, if hypotenuse AB = EF and side AC = DE, then $\Delta ABC \cong \Delta$_____.

(28) If altitudes CE and BF of a triangle ABC are equal, then AB = _____.

(29) In an isosceles triangle ABC with AB = AC, if BD and CE are its altitudes, then BC is _____CE.

(30) In a Δ ABC, if AB = AC and $\angle 40^0$, then $\angle C$ = _____.

(31) In a right triangle, the hypotenuse is the _____side.

(32) If two sides of a triangle are unequal, the longer side has the _____ angle opposite to it.

(33) In a triangle, the greater angle has the _____ side opposite to it.

(34) The sum of any two sides of a triangle is _____than the third side.

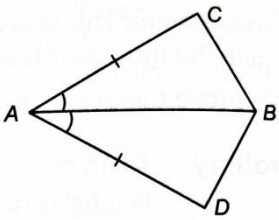
(35) Of all the segments that can be drawn to a given line from a point not lying on it, the perpendicular segment is the _____.

(36) The perimeter of a triangle is _____than the sum of its three medians.

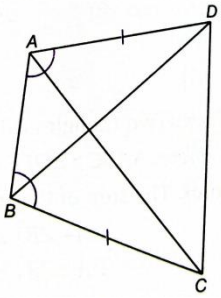
(37) The sum of three altitudes of a triangle _____than the perimeter of the triangle.

(38) If all the altitudes of a triangle are equal, than the triangle is _____.

(39) In quadrilateral ADBC (figure), AC = AD and AB bisects ∠A. Show that ΔABC ≅ Δ ABD. What can you say about BC and BD?

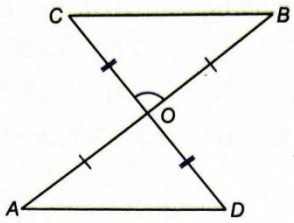


(40) ABCD is a quadrilateral in which AD = BC and ∠DAB = ∠CBA (figure). Prove that (i) ΔABD = ΔBAC (ii) BD = AC (iii) ∠ABD = ∠BAC.

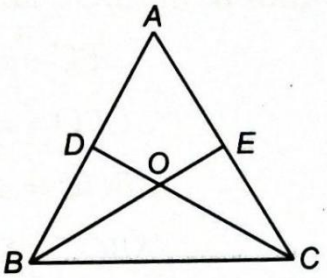


(41) In Figure, OA = OB and OD = OC. Show that

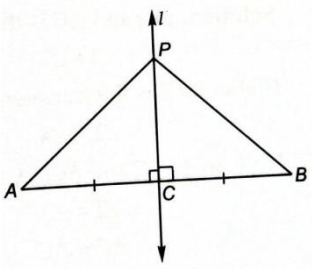
(i) ΔAOD ≅ Δ BOC and (ii) AD || BC.



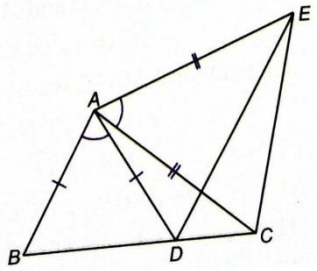
(42) In figure, it is given that AD = AE and BD= CE, prove that ΔADC = ΔAEB.



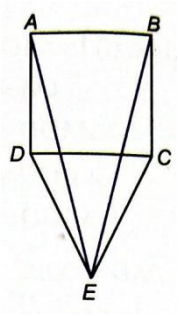
(43) AB is a line segment and *l* is its perpendicular bisector. If a point *P* lies on *l*, show that *P* is equidistant from A and B.



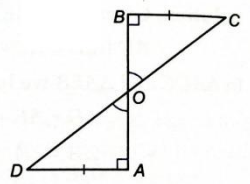
(44) In figure AC = AE, AB = AD and ∠BAD = ∠EAC, prove that BC = DE.



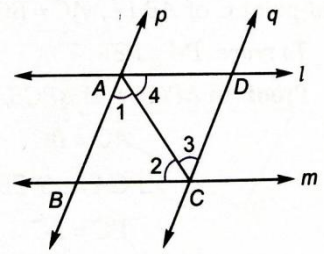
(45) CDE is an equilateral triangle formed on a side CD of a square ABCD (Figure). Show that ΔADE = ΔBCE.



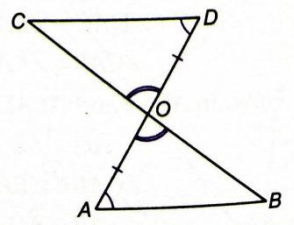
(46) AD and BC are equal perpendiculars on a line segment AB is Figure. Show that CD bisects AB.



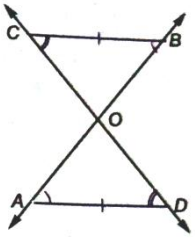
(47) l and m are two parallel lines intersected by another pair of parallel lines p and q (figure). Show that ΔABC = ΔCDA.



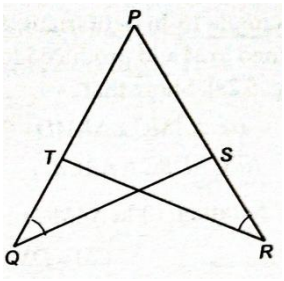
(48) Line segment AB is parallel to another line segment CD. O is the mid-point of AD (Figure). Shoat that (i) ΔAOB = ΔDOC (ii) is the mid-point of BC.



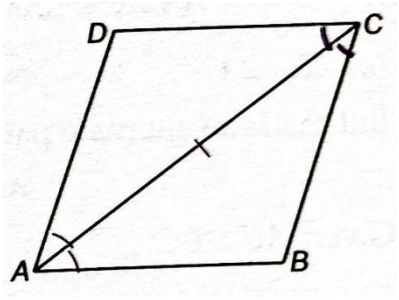
(49) In figure two line AB and CD intersect each other at the point O such that BC || DA and BC = DA. Show that O is the mid-point of both the line-segments AB and CD.



(50) In Figure, PQ = PR and ∠Q = ∠R. Prove that ΔPQS = ΔPRT.

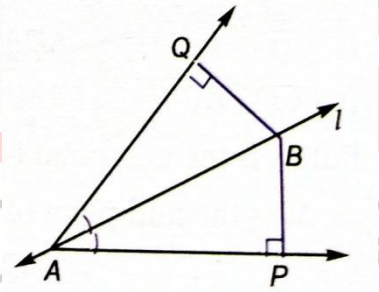


(51) ABCD is a quadrilateral such that diagonal AC bisects the angles A and C. Prove that AB = AD and CB = CD.



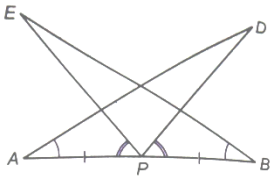
(52) Line *l* is the bisector of an angle ∠A and B is any point on *l*. BP and BQ are perpendicular from B to the arms of ∠A. Show that

(i) ΔAPB = ΔAQB (ii) BP = BQ or B is equidistant from the arms of ∠A.



(53) AB is line segment and P is its mid-point. D and E are points on the same side of AB, such that ∠BAD = ∠ABE and ∠EPA = ∠DPB. (Figure). Show that

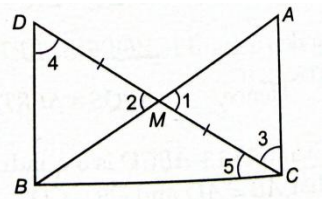
(i) ΔDAP = ΔEBP (ii) AD = BE



(54) 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 the point B (figure). Show that.

(i) ΔAMC = ΔBMD (ii) ∠DBC is a right angle.

(iii) ΔDBC = ΔACB (iv) CM = $\frac{1}{2}$ AB.

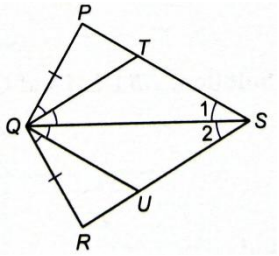


(55) In a right triangle, prove that the line-segment joining the mid-point of the hypotenuse to the opposite vertex is half the hypotenuse.

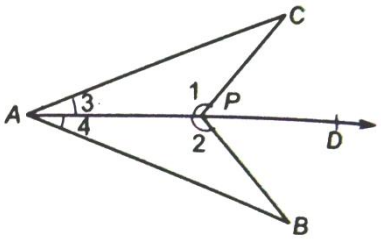
(56) In figure PQRS is a quadrilateral and T and U are respectively points on PS and RS such that PQ = RQ

$\angle PQT = \angle RQU$ and $\angle TQS = \angle UQS$

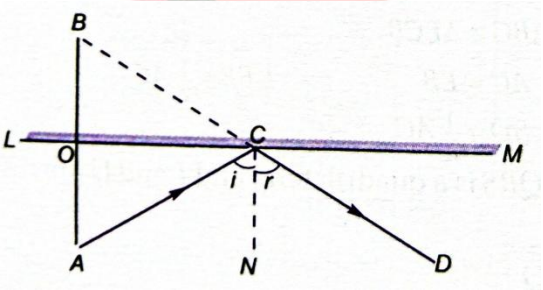
Prove that QT = QU.



(57) In figure $\angle CPD = \angle BPD$ and AD is the bisector of $\angle BAC$. Prove that $\Delta CAP = \Delta BAP$ and hence CP = BP.

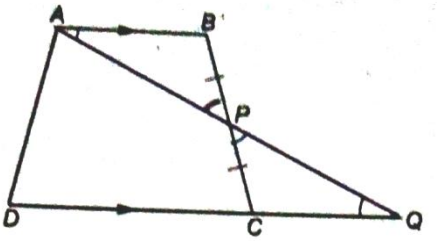


(58) The image of an object placed A before a plane mirror LM is seen at the point B by an observe at D as shown figure. Prove that the image is as far behind the mirror as the object is in front of the mirror.



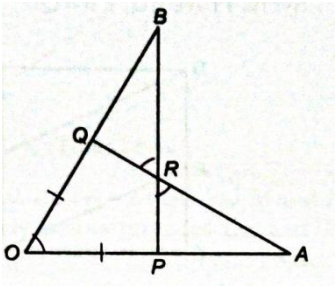
(59) In figure, ABCD is a quadrilateral in which AB || DC and P is the mid-point of BC. On producing, AP and DC meet at Q. prove that

(i) AB = CQ (ii) DQ = DC + AB.

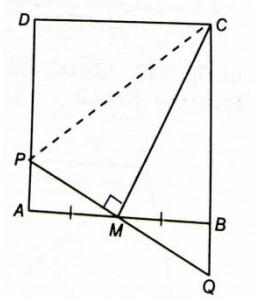


(60) In figure, OA = OB and OP = OQ. Prove that

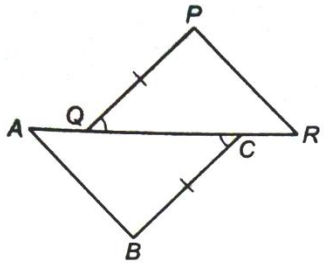
(i) PR = QR (ii) AR = BR.



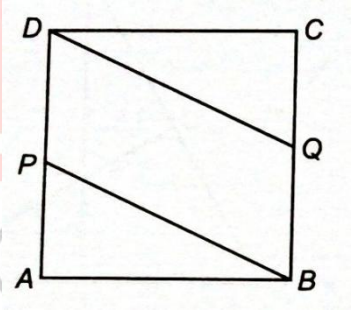
(61) In figure, ABCD is a square, M is the mid-point of AB and PQ ⊥ CM meets AD at P and CB produced at Q. Prove that (i) PA = BQ and (ii) CP = AB + PA.



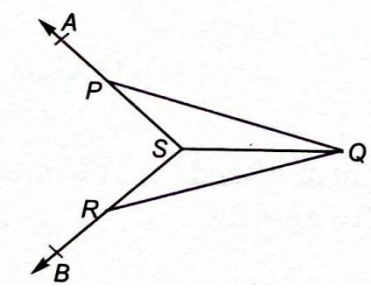
(62) Prove that AQ = CR, BC = PQ and ∠ACB = ∠PQR. Prove that ΔABC = ΔRPQ.



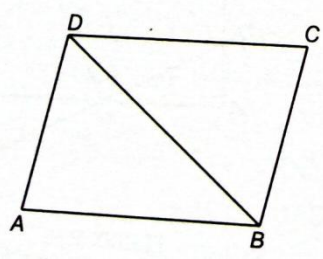
(63) In figure ABCD is a square. P and Q are the mid-points of the sides AD and BC responsively. Prove that PB = QD.



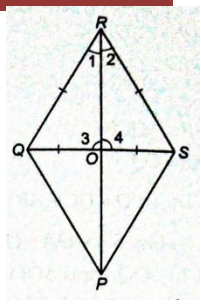
(64) In figure PQ = RQ and ∠PQS = ∠RQS, prove that ∠APQ = ∠BRQ.



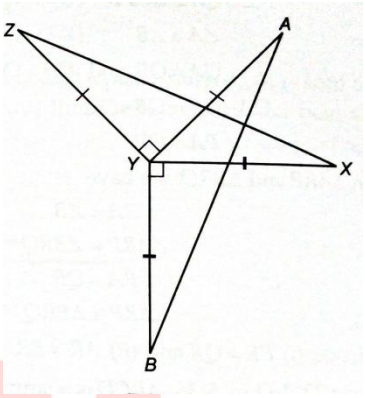
(65) In figure, AB = DC and ∠ABD = ∠CDB. Prove that AD = CB.



(66) In a quadrilateral PQRS, RP bisects ∠R and RQ = RS. Prove that (i) PQ =PS (ii) RP is the perpendicular bisector of QS.



(67) In figure AY ⊥ ZY and BY ⊥ XY such that AY = ZY and BY= XY. Prove AB = ZX.



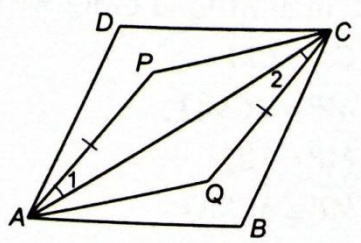
(68) In figure P and Q are two points inside a parallelogram ABCD such that AP = QC and AP||QC. Prove that

(i) ΔAPC =Δ AQC

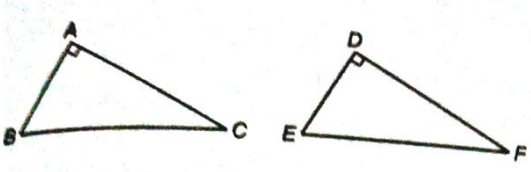
(ii) PC = AQ

(iii) PC || AQ

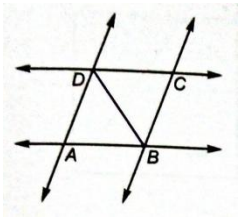
(iv) APCQ is a parallelogram



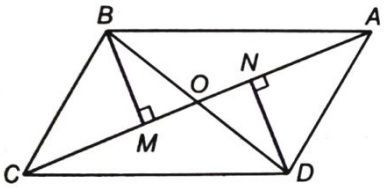
(69) In two right triangle ABC and DEF in Figure, if AB = DE and ∠C = ∠F, show that Δ ABC = Δ DEF.



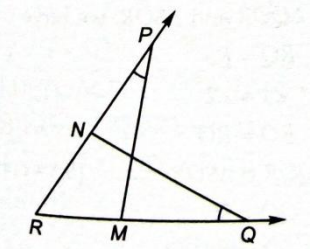
(70) In figure AB || CD and AD||BC. Prove that ΔADB = ΔCBD.



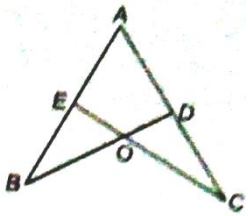
(71) In figure BM and DN are both perpendiculars to the segments AC and BM=DN. Prove that AC bisects BD.



(72) Refers to figure. On the arms PR and QR of an ∠PRQ, points N and M are taken respectively such that ∠MPR = ∠NQR. If PR = QR, then prove that RM= RN.

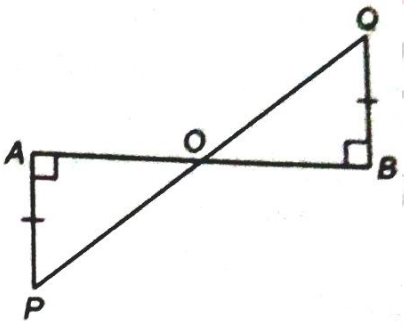


(73) In figure, ∠B = ∠C and AB = AC. Prove that ΔABD = ΔACE.

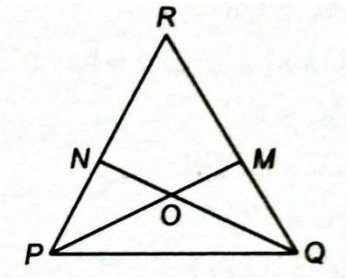


(74) In a right angled triangle, one acute angle is double the other. Prove that the hypotenuse is double the smallest side

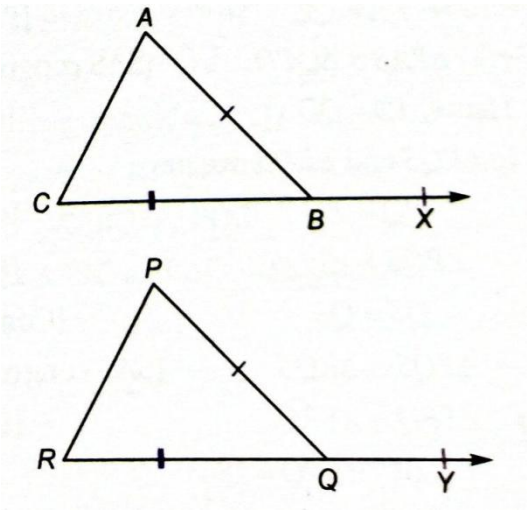
(75) In figure, AP and BQ are perpendicular to the line –segment AB and AP = BQ. Prove that O is the mid-point of line segments AB and PQ.



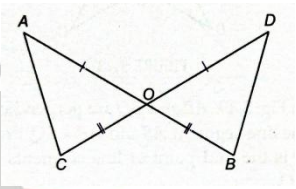
(76) In figure, ∠QPR = ∠PQR and M and N are respectively points on side QR and PR of ΔPQR, such that QM = PN. Prove that OP= OQ, where O is the point of intersection of PM and QN.



(77) In Δs ABC and PQR of figure AB = PQ, BC =QR and CB and RQ are extended to X and Y respectively such that ∠ABX = ∠PQY. Prove that ΔABC = ΔPQR.



(78) As shown in figure the line segments AB and CD intersect at O in such a way that OA = OD and OB = OC. Prove that AC = BD but AC may not be parallel to BD.



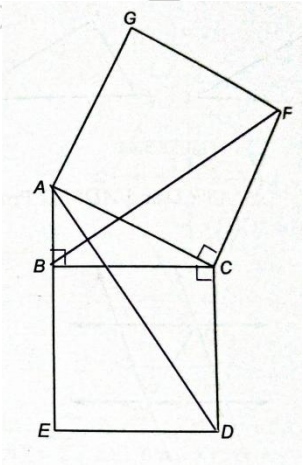
(79) If the external bisector of the vertical angle of a triangle is parallel to its base, then the triangle is isosceles.

(80) Find all the angles of an equilateral triangle.

(81) AB is a segment. AX and BY are two equal segments drawn on opposite sides of line AB such that AX || BY. If line segments AB and XY intersect each other at the point P, prove that

(i) $\Delta APX \cong \Delta BPY$, and

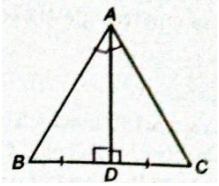
(ii) line segments AB and XY bisect each other at P.



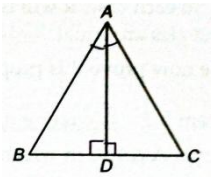
(82) In figure ABC is a triangle, right angled at B. If BCDE is a square on side BC and ACFG is a square on AC, prove that AD = BF.

(83) ABC and DBC are two triangle on the same base BC such that AB= AC and BD = CD. Prove that $\angle ABD = \angle ACD$.

(84) In Δ ABC, AD is the perpendicular bisector of BC (Figure). Show that ΔABC is an isosceles triangle in which AB = AC.



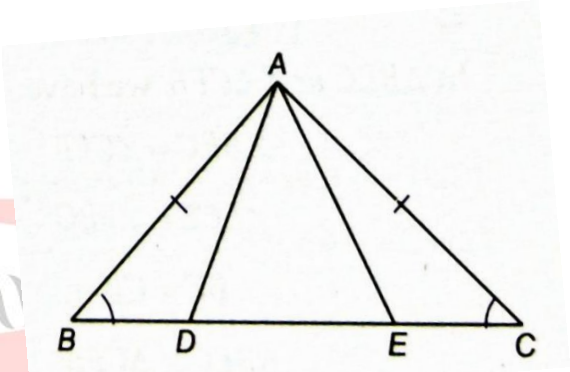
(85) In ΔABC, the bisector of ∠A is perpendicular to base BC (figure). Show that AB = AC and ΔABC is isosceles.



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

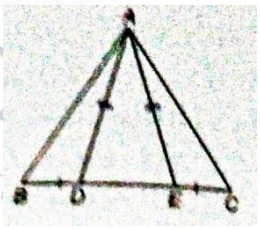
(87) O is a point in the interior of a square ABCD such that OAB is an equilateral triangle. Show that ΔOCD is an isosceles triangle.

(88) In an isosceles ΔABC, with AB = AC, the bisectors of ∠B and ∠C intersect each other at O. Joint A to O. Show that :
(i) OB = OC (ii) AO bisects ∠A

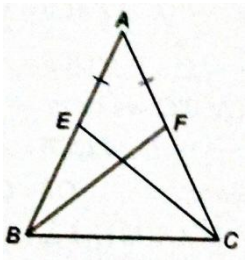


(89) In an isosceles triangle ABC with AB = AC, D and E are points on BC such that BE = CD (Figure). Show that AD = AE.

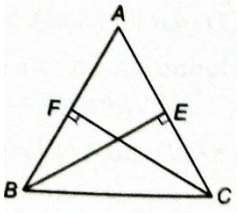
(90) In figure D and E are points on side BC of a ΔABC such that BD = CE and AD = AE. Show that ΔABD = ΔACE.



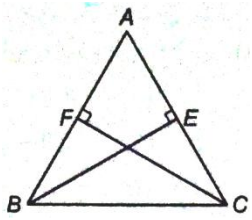
(91) E and F are respectively the midpoints of equal sides AB and AC and ΔABC (Figure). Show that BF = CE.



(92) ABC is an isosceles triangle in which BE and CF are altitudes drawn to equal sides AB and AC (figure). Show that these altitude are equal.



(93) ABC is triangle in which altitudes BE and CF to side AC and AB are equal (figure). Show that



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

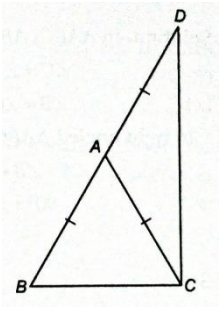
(ii) AB = AC, i.e. ΔABC is an isosceles triangle

(94) ABC is a right angled triangle in which $\angle A = 90^0$ and AB = AC. Find $\angle B$ and $\angle C$.

(95) Prove that each angle of an equilateral triangle is 60^0.

(96) Angles A, B and C of a ΔABC are equal. Prove that the triangle ABC is equilateral.

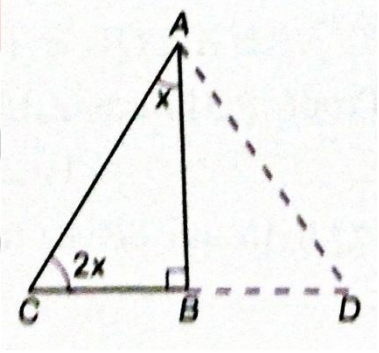
(97) ΔABC is an isosceles triangle in which AB = AC. Side BA is produced to D such that AD = AB (Figure). Show that $\angle BCD$ is a right angle.



(98) In a triangle ABC, D is mid-point of side AC such that BD = $\frac{1}{2}$AC. Show that $\angle ABC$ is a right angle.

(99) ABC is a right triangle with AB = AC. Bisector of $\angle A$ meets BC at D. Prove that BC = 2 AD.

(100) In figure, ABC is a right triangle and right angled at B such that $\angle BCA = 2\angle BAC$. Show that hypotenuse AC = 2BC.



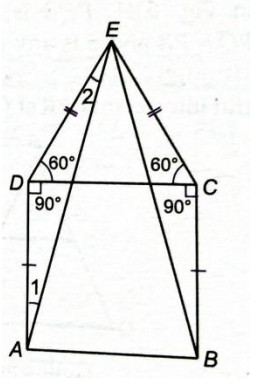
(101) ABC is a right triangle such that AB = AC and bisector of angle C intersects the side AB at D. Prove that AC + AD = BC.

(102) P is a point on the bisector of $\angle ABC$. If the line through P, parallel to BA meet BC at Q, prove that BPQ is an isosceles triangle.

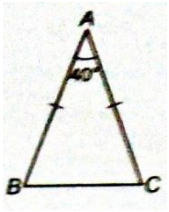
(103) Bisector of the angles B and C of an isosceles triangle with AB = AC intersect each other at O. BO is produced to a point M. Prove that $\angle MOC = \angle ABC$.

(104) Bisectors of the angles B and C of an isosceles triangle ABC with AB = AC intersect each other at O. Show that external angle adjacent of $\angle ABC$ is equal $\angle BOC$.

(105) In figure, ABCD is a square and ΔABCD is a square and ΔDEC is an equilateral triangle. Prove that (i) ΔADE = ΔBCE (ii) AE =BE (iii) ∠DAE = 15^0.



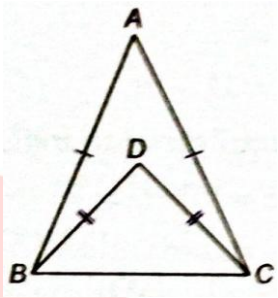
(106) In figure AB = AC, and ∠A = 40^0. Verify that ∠C = 70^0



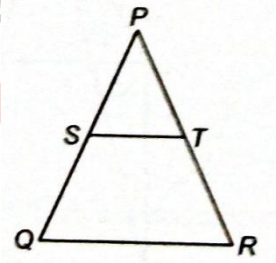
(107) In an isosceles triangle, if the vertex angle is twice the sum of the base angles, calculate the angles of the triangle.

(108) If in ΔABC, AB = AC and ∠B = 55^0, find ∠A and ∠C.

(109) In figure AB = AC and DB = DC, then show that $\frac{\angle ABD}{\angle ACD}$ =1.



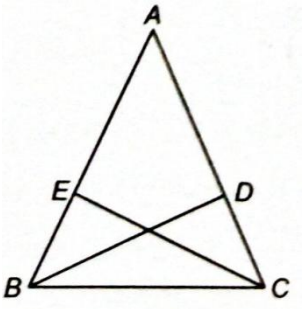
(110) PQR is a triangle in which PQ = PR and S is any point on the side PQ. Through S, a line ST is drawn parallel to QR and intersecting PR at T. Prove that PS= PT.



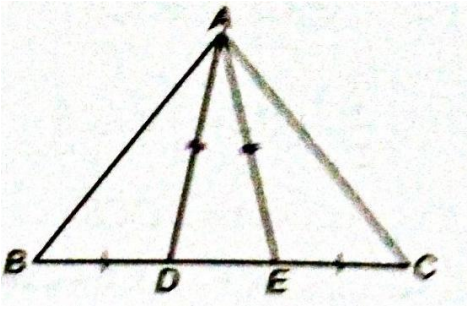
(111) In figure, BD and CE are the bisectors of ∠B and ∠C of an isosceles triangle ABC with AB = AC. Prove that BD = CE.

(112) If the external bisector of the vertical angle of a triangle is parallel to its base, then the triangle is isosceles.

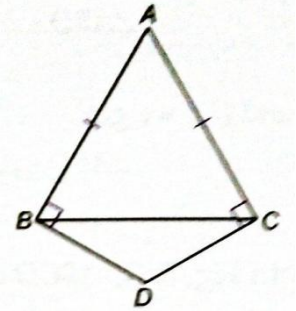
(113) In a ΔABC, median AD is perpendicular to BC. Prove that the ΔABC is an isosceles triangle.



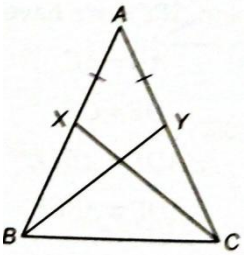
(114) In figure D and E are points on side BC of a ΔABC such that BD = CE and AD = AE. Prove that AB = AC.



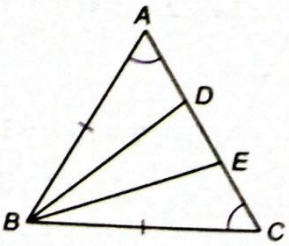
(115) In figure ΔABC is isosceles with AB = AC, AB ⊥ BD and AC ⊥ CD. Prove that BD = CD.



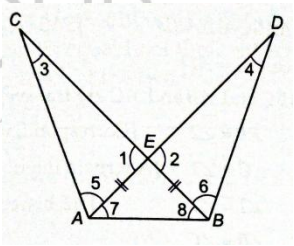
(116) In figure X and Y are the points on equal sides AB and AC of a ΔABC such that AX = AY. Prove that XY= YB.



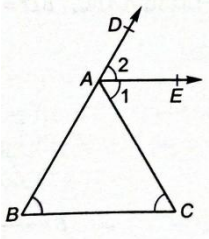
(117) In given figure AB = BC, AD = EC, prove that ΔABE ≅ ΔDBC.



(118) In figure AE = BE and ∠C = ∠D, prove that AD = BC.



(119) In figure, AE is the bisector of ∠CAD and AE ||BC. Prove that ΔABC is isosceles.



(120) In figure ABC is an equilateral triangle PQ ||AC and AC is produced to R such that CR = BP. Prove that QR bisects PC.