EXERCISE # 1
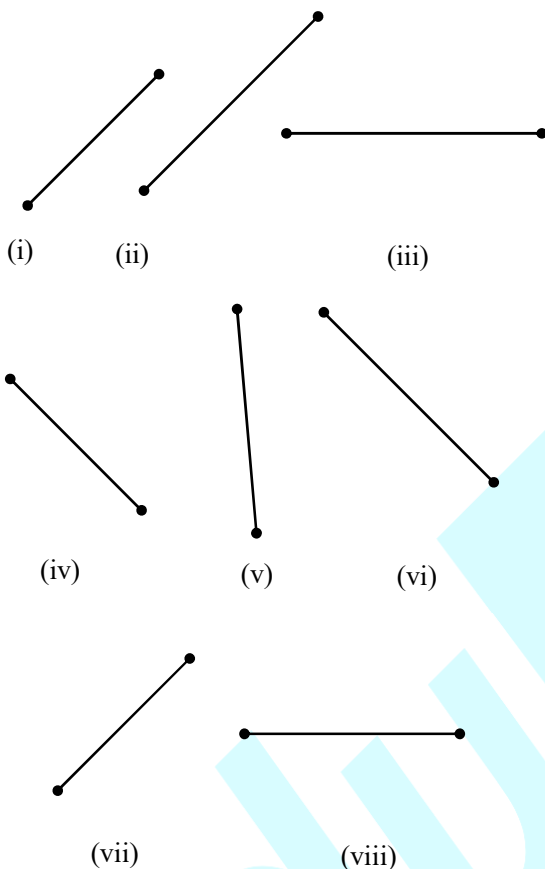
Q.1 Which of the line segments are congruent ?
Measure and state.

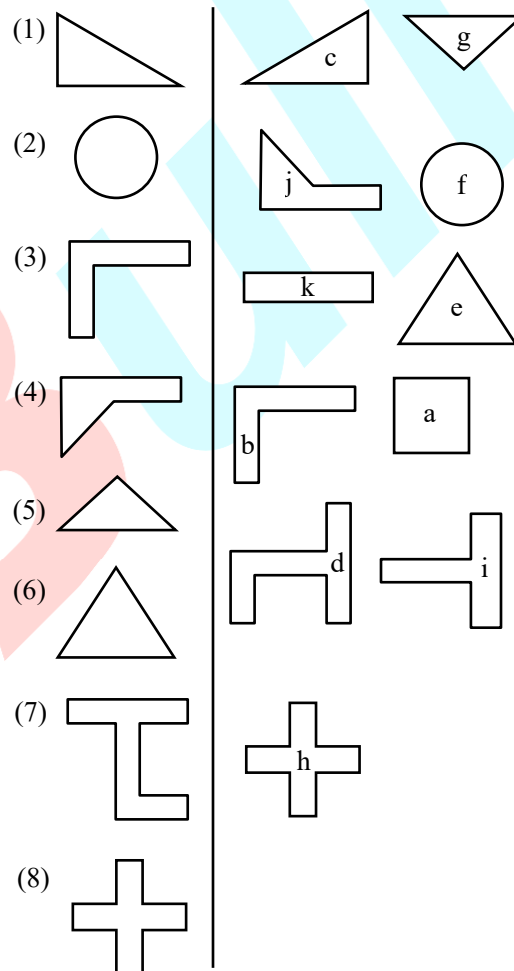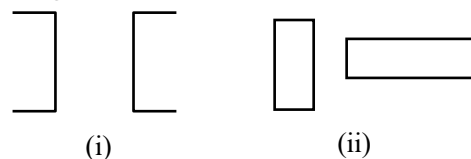(i)   (ii)   (iii)

(iv)   (v)   (vi)

(vii)   (viii)

Q.2 Measure each of the angles given below and write which three pairs are congruent :
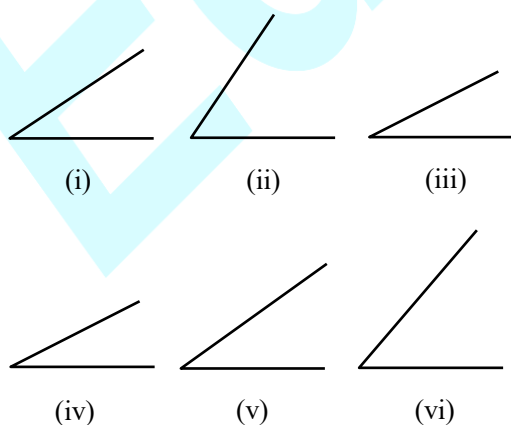
(i)   (ii)   (iii)

(iv)   (v)   (vi)

Q.3 Pair each given figure with a congruent figure from the collection at the right.

(1)

(2)

(3)

(4)

(5)

(6)
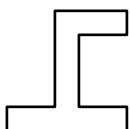
(7)

(8)

c   g

j   f

k   e
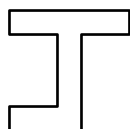
a

b

d   i

h

Q.4 Which of the following pairs of figures are congruent ?
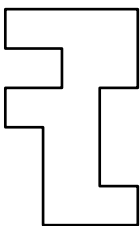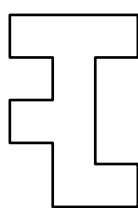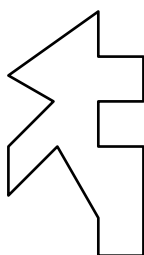
(i)   (ii)
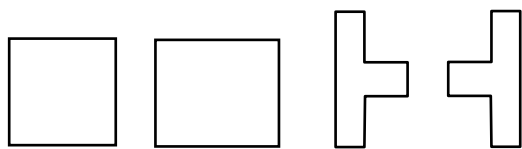
(iii)   (iv)

(v)

(vi)

(vii)

Q.5 Two congruent line segments are given. If the length of one segment is 6 cm, find the length of other segment.

Q.6 If ∠ABC ≅ ∠PQR and ∠ABC = 60°, then find the magnitude of ∠PQR.

Q.7 Fill in the blanks :
(i) If two line segments are congruent, they are equal in ……
(ii) If two angles are congruent, they are equal in …….
(iii) Two line segments are congruent if …….
(iv) When we write ∠P = ∠Q, it means …….

(v) If two squares are congruent, they are equal in ……..
(vi) If two circles are congruent, they are equal in ……

Q.8 If ΔABC ≅ ΔXYZ, write the parts of ΔXYZ that correspond to :
(i) ∠B   (ii) $\overline{YZ}$
(iii) ∠C   (iv) $\overline{AC}$

Q.9 When ΔPQR ≅ ΔABC under the correspondence ΔPQR ↔ ΔABC, write all the corresponding congruent parts of the triangles.
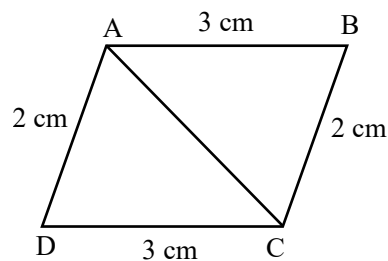
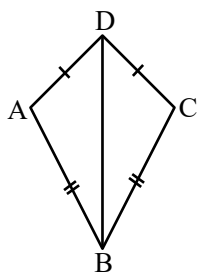**Q.10** In the following pairs of triangles, state which are congruent by applying SSS condition :
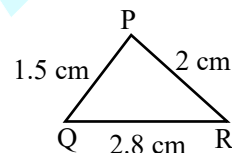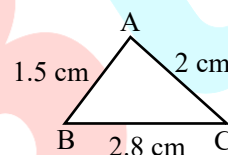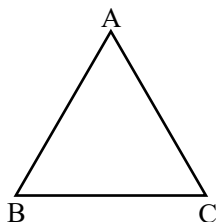

(i)
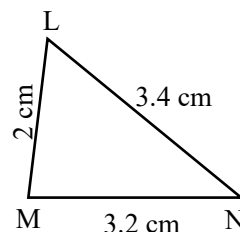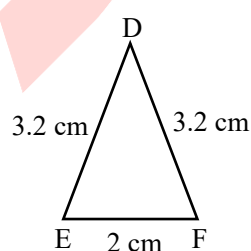
(ii)

(iii)

Q.11 In figure, AD = DC and AB = BC.
(i) Is ΔABD ≅ ΔCBD ?
(ii) State the three pairs of matching parts you have used to answer (i).

Q.12 ΔABC is isosceles with AB = AC. State if ΔABC ≅ ΔACB. If yes, state three relations that you have used to arrive at your answer figure.

Q.13 In figure, AB = DC and AD = BC.
(i) Is ΔABC ≅ ΔCDA ?
(ii) What congruence condition have you used ?
(iii) You have used some fact, not given in the question. What is that ?
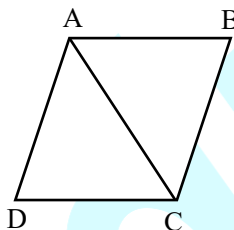
Q.14 In figure, ΔABC is isosceles with AB = AC. D is the mid-point of base BC.
(i) Is ΔADB ≅ ΔADC ?
(ii) State the three pairs of matching parts that you have used to arrive at answer (i).
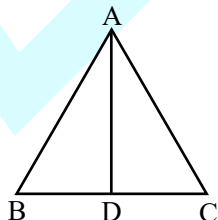
Q.15 In the following figure, a pair of triangles is given. Apply SSS condition to verify their congruence.
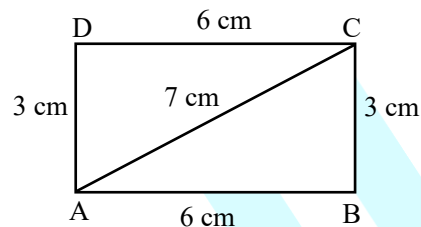
Q.16 In ΔABC and ΔDEF, AB = DF and BC = EF. What additional information is required to make the two triangles congruent by SSS congruence condition ?
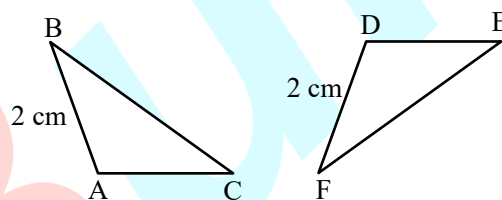
Q.17 In the following pairs of triangles by applying SSS condition, state which are congruent? State the result in symbolic form.
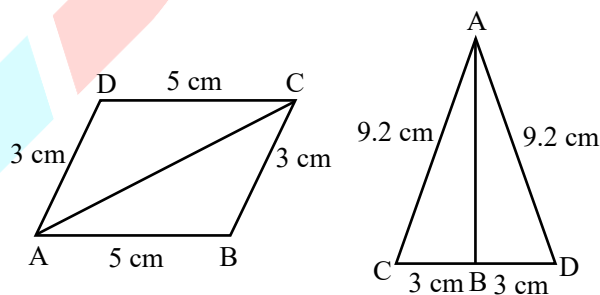
Q.18 Verify the SAS congruence condition in the following pairs of triangles

(i)

(ii)

Q.19 Show that in an isosceles triangle, angles opposite to equal sides are equal.

Q.20 In a ΔABC, ∠A = 100° and AB = AC. Find ∠B and ∠C.

Q.21 In figure, AB = AD and ∠BAC = ∠DAC.
(i) State if the two triangles are congruent.
(ii) State the congruence condition.
(iii) Complete the following :
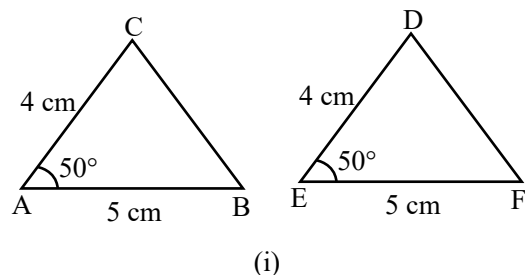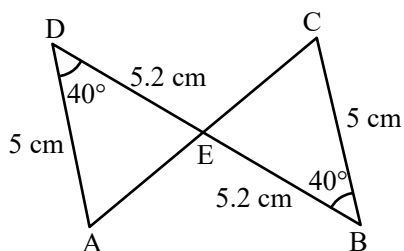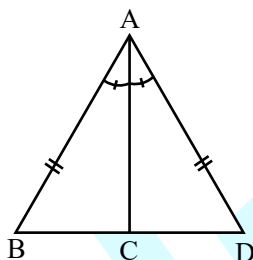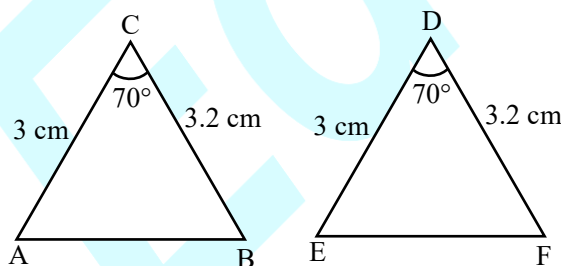
∠ABC = …….

∠ACD = …….

Q.22 In the following pair of triangles the measures of some parts are indicated. Use SAS condition to prove their congruence figure.

Q.23 In figure, AB ∥ DC and AB = DC
(i) Is ∠BAC = ∠DCA? Why ?
(ii) Is ΔABC ≅ ΔCDA by SAS congruence condition ?

(iii) State the three facts you have used to answer (ii).
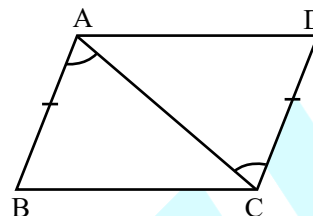
Q.24 Which of the following pairs of triangles are congruent :
(i) ΔABC, AB = 10 cm, ∠A = 40°, ∠B = 55°, ΔEFB, EF = 10 cm, ∠E = 40°, ∠F = 55°,
(ii) ΔPQR, PQ = 5 cm, ∠P = 37°, ∠R = 64°, ΔEFG, EF = 5 cm, ∠E = 37°, ∠F = 64°.

Q.25 In figure, AD bisects ∠A and AD ⊥ BC.
(i) Is ΔADB ≅ ΔADC by ASA congruence condition ?
(ii) If yes, state the three facts you have used to answer (i).
(iii) Is BD = DC ? Why ?
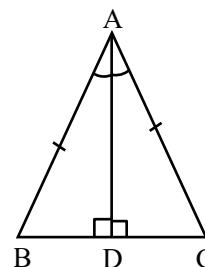
Q.26 In figure, which pairs of triangles are congruent by ASA congruence condition? If congruent, write the congruence of the two triangles in symbolic form.

(i)

(ii)

(iii)

Q.27 In figure, AX bisects ∠BAC and ∠BDC. Find the third pair of corresponding parts to ensure that ΔABD ≅ ΔACD by ASA congruence condition.
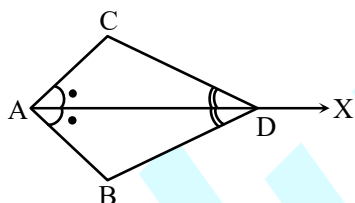
Q.28 In the following pairs of triangles, verify the RHS congruence condition :
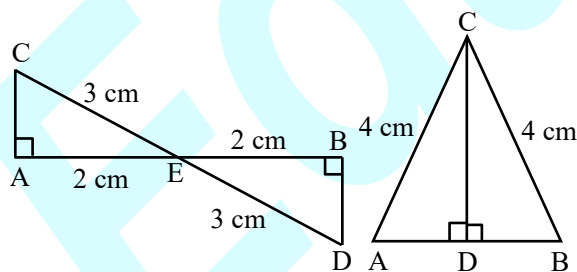
Q.29 If ΔABC is an isosceles triangle such that AB = AC then prove that altitude AD from A on BC bisects BC.
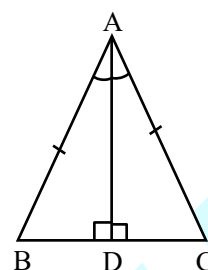
Q.30 In figure, BD and CE are altitudes of ΔABC and BD = CE.
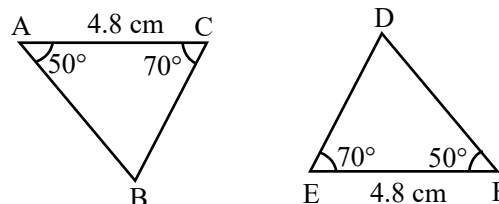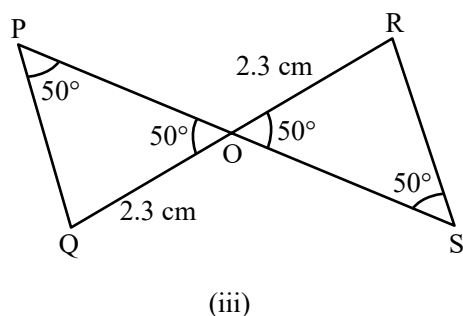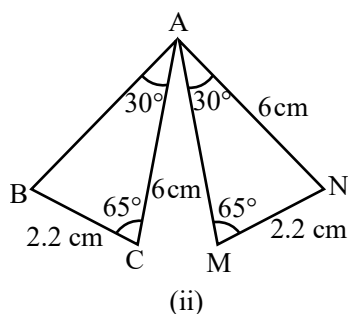
(i) Is ΔBCD ≅ ΔCBE ?

(ii) State the three pairs of matching parts you have used to answer (i).
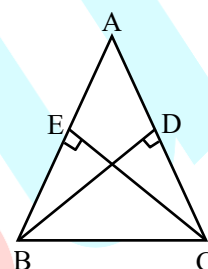
Q.31 In figure, AC = BD and DA ⊥ AB and also CB ⊥ AB. State which of the following statements are true :

(i) ΔABC ≅ ΔABD   (ii) ΔABC ≅ ΔADB

(iii) ΔABC ≅ ΔBAD

State the pairs of matching parts you have used to arrive at the answer.

Now, is it true that AD = BC ?
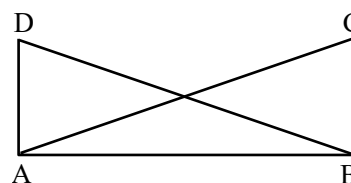
Q.32 In the following pair of right triangles figure, the measures of some parts are given. Verify if the two triangles are congruent by RHS congruence condition.
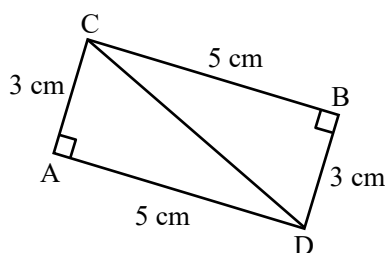
Q.33 In figure, AB = AD, AD ⊥ CD and AB ⊥ BC.
(i) Find the third pair of corresponding part so that ∆ABC ≅ ∆ADC by RHS congruence condition.
(ii) Is BC = DC ? Why?
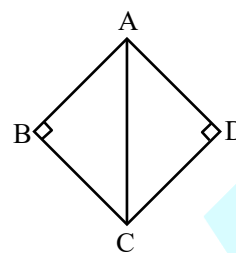
Q.34 In figure, PL ⊥ OB and PM ⊥ OA such that PL = PM. Is ∆PLO ≅ ∆PMO ?

ANSWER KEY

1. (i) ≅ (vii) ; (ii) ≅ (vi) ; (iii) ≅ (v) ; (iv) ≅ (viii)

2. (i) ≅ (v) ; (ii) ≅ (vi) ; (iii) ≅ (iv)

3. (1) c, (2) f, (3) b, (4) j, (5) g, (6) e, (7) d, (8) h

4. (i), (iv), (v)

5. 6 cm

6. 60°

7. (i) length, (ii) magnitude, (iii) they are equal in length, (iv) ∠P ≅ ∠Q, (v) sides, (vi) radii

8. (i) ∠Y, (ii) $\overline{BC}$, (iii) ∠Z, (iv) $\overline{XZ}$

9. ∠P ≅ ∠A ; ∠Q ≅ ∠B ; ∠R ≅ ∠C ; PQ ≅ AB ; QR ≅ BC ; PR ≅ AC

10. (i), (iii)

11. (i) Yes, (ii) AD = CD, AB = CB and BD = BD

12. Yes ; AB = AC, AC = AB, BC = CB

13. (i) Yes, (ii) AB = CD, BC = DA, SSS congruency, (iii) AC = CA

14. (i) Yes, (ii) AD = AD, AB = AC, DB = DC
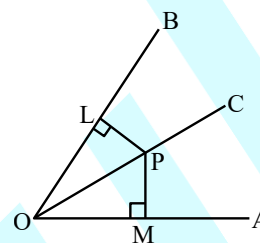
16. AC = DE

17. (i) ∆ABC ≅ ∆CDA, (ii) ∆ABC ≅ ∆ABD

20. 40°, 40°

21. (i) Yes, ∆ABC ≅ ∆ADC, (ii) SAS congruence condition , (iii) ∠ADB, ∠ACB

23. (i) Yes, Alternate angles, (ii) Yes, (iii) AB = CD, AC = CA, ∠BAC = ∠CDA

24. (i) ∆ABC ≅ ∆EFG

25. (i) Yes, (ii) ∠ADB = ∠ADC (= 90°), AD = AD, ∠BAD = ∠CAD, (iii) Yes, BD = DC (CPCT)

26. (i) ΔACB ≅ ΔFED

27. AD = AD

30. (i) Yes, (ii) ∠BDC = ∠CEB (= 90°), BC = CB, BD = CE

31. (iii) ∠ABC = ∠BAD, AC = BD, AB = BA, Yes, AD = BC (CPCT)

32. Yes

33. (i) AC is common, (ii) Yes, BC = DC (CPCT)

34. Yes

EXERCISE # 2

True/False type Questions (Q. 1 to 10)

Q.1 Two line segments are congruent if they have same length.

Q.2 Two squares are congruent if they have same corresponding angles.

Q.3 Two circles are congruent if they have any radius.

Q.4 Three sides and three angles are the six matching parts for the congruence of triangles.

Q.5 AAA is one of the cases for proving triangles congruent.

Q.6 SAS is one of the cases for proving triangles congruent.

Q.7 SSA is one of the cases for proving triangles congruent.

Q.8 If ΔDEF ≅ ΔBCA, then EF = CA.

Q.9 If ΔDEF ≅ ΔBCA, then ∠F is equal to ∠A.

Q.10 If ΔPQR ≅ ΔABC, then their corresponding angles are equal.

Fill in the blanks type Questions(Q. 11 to 25)

Q.11 Two line segments AB and CD are of equal length of 10 cm, M and N are mid points of AB and CD respectively. Is AM ≅ CN? —— .

Q.12 Two circles have equal areas. Are these circles congruent? —— .

Q.13 Area of two congruent square is equal. Is it true? —— .

Q.14 ΔABC ≅ ΔXYZ. If ∠XYZ = 65°, the measure of ∠ABC is —— .

Q.15 If all the corresponding angles of two triangles are equal, are these two triangles congruent? —— .

Q.16 A triangle PQR has each angle of 60°. Another triangle DEF also each angle of 60°. Is ΔPQR ≅ ΔDEF? —— .

Q.17 ΔABC ≅ ΔDEF. If ∠B = 50°, ∠C = 70°, find the measure of ∠D —— .

Q.18 ΔPQR ≅ ΔXYZ and PR = 7 cm, find XZ —— .

Q.19 In ΔABC and ΔPQR, AB = PQ, ∠B = ∠Q and AC = PR. Is ΔABC ≅ ΔPQR? —— .

Q.20 If the two sides and an angle of one triangle are respectively equal to two sides and an angle of the other, are the triangles congruent? —— .

Q.21 Between two congruent line segments, one has a measure of 7 cm, the measure of the other segment is —— .

Q.22 Two circles C_1 and C_2 are —— if their radii are equal.

Q.23 If $m\angle A = m\angle B$, we can also mean for it —— .

Q.24 Two figures are said to be congruent if they have —— and —— .

Q.25 —— sides and —— angles are the six matching parts for the congruence of triangles.

Q.26 State the correspondence between the vertices, sides and angles of the following pairs of congruent triangles :
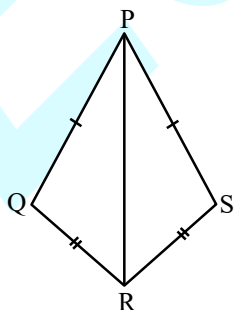(i) $\Delta XYZ \cong \Delta PQR$
(ii) $\Delta NPM \cong \Delta RQS$

**Q.27** Given that $\Delta ABC \cong \Delta RPQ$, $\angle A = 50°$, $\angle B = 60°$, find $\angle P$, $\angle Q$, $\angle R$.

Q.28 In an isosceles ΔABC, AB = AC, D and E are two points on the sides AB and AC respectively such that AD = AE. Prove that $\Delta ABE \cong \Delta ACD$.

**Q.29** In the figure given below, PQ = PS and QR = RS. Find the third pair of corresponding parts that makes $\Delta PQR \cong \Delta PSR$ by SSS congruence condition.
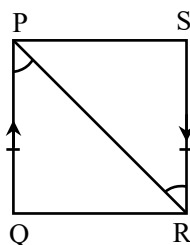

Q.30 Given below are pairs of congruent triangles. State the property of congruence and name the congruent triangles in each case.

(i)

(ii)

(iii)

(iv)
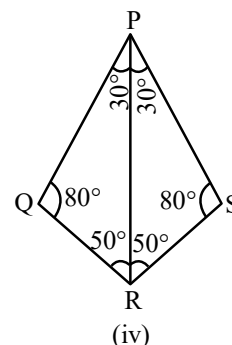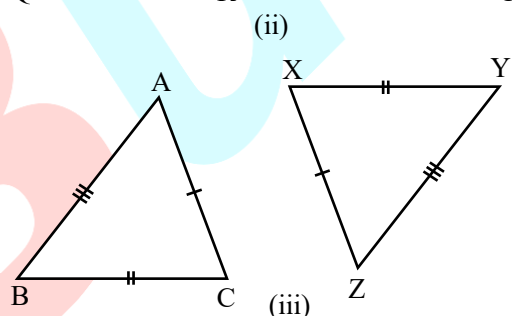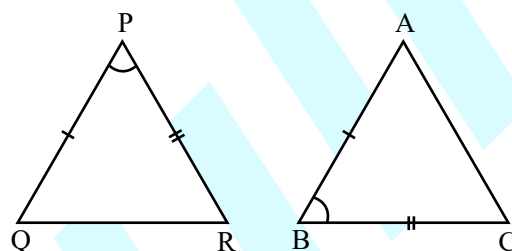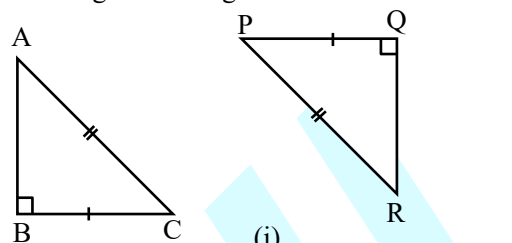
Q.31 In the figure below, are the two triangles congruent? If yes, mention the congruence of the two triangles in symbolic form.
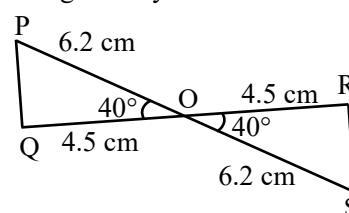
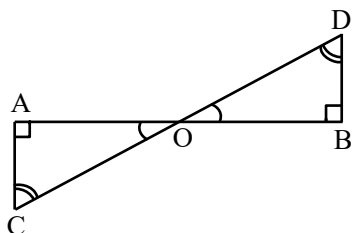**Q.32** In the figure, PQ ∥ SR and PQ = SR

(i) Is ∠QPR = ∠SRP? Why ?

(ii) Is ΔPQR ≅ ΔRSP? If yes write congruence condition.
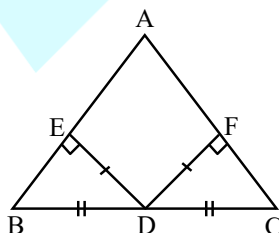
Q.33 In the given figure, AC ⊥ AB, DB ⊥ AB and AC = DB. Prove that

(i) ΔOAC ≅ ΔOBD, write the congruency condition.

(ii) Is OA = OB? Why ?

Q.34 Prove that in an isosceles triangle, the angles opposite to equal sides are equal.

Q.35 In figure given below, PQ = PR and QS = SR. Prove that ΔPSQ ≅ ΔPSR and hence show that ∠QPS = ∠RPS.
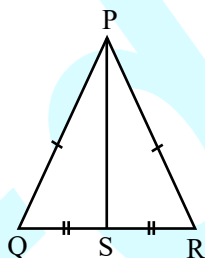
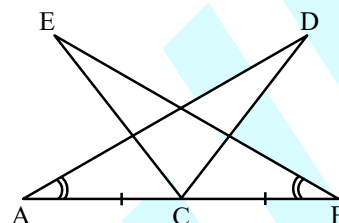**Q.36** In the figure, it is given that ED = DF, BD = DC, DE ⊥ AB and DF ⊥ AC. Prove that AE = AF.

Q.37 Prove that the bisector of the vertical angle of an isosceles triangles bisects the base at right angles.

Q.38 In the adjacent figure, C is mid point of AB, ∠BAD = ∠ABE.

Prove that
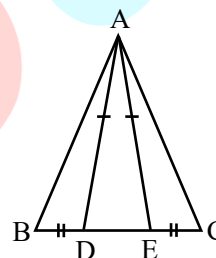
(i) ΔDAC ≅ ΔEBC   (ii) DA = EB

Q.39 In the adjoining figure, AD = AE, D and E are points on BC such that BD = EC. Prove that AB = AC.

Q.40 In figure, the line segment joining the mid points M and N of opposite sides AB and DC of quadrilateral ABCD is perpendicular to both sides. Prove that the other two sides of the quadrilateral are equal.

ANSWER KEY

1. T	**2.** F	**3.** F	**4.** T	**5.** F	**6.** T	**7.** F
8. T	**9.** F	**10.** T	**11.** Yes	**12.** Yes	**13.** Yes	**14.** 65°
15. No	**16.** No	**17.** 60°	**18.** 7 cm	**19.** Yes	**20.** No	**21.** 7 cm

22. Congruent **23.** ∠A = ∠B **24.** Same Shape, Same Size **25.** 3, 3

26. (i) X ↔ P, Y ↔ Q, Z ↔ R, $\overline{XY} = \overline{PQ}$, $\overline{YZ} = \overline{QR}$, $\overline{XZ} = \overline{PR}$, ∠X = ∠P, ∠Y = ∠Q, ∠Z = ∠R

(ii) N ↔ R, P ↔ Q, M ↔ S, $\overline{NP} = \overline{RQ}$, $\overline{PM} = \overline{QS}$, $\overline{NM} = \overline{RS}$, ∠N = ∠R, ∠P = ∠Q, ∠M = ∠S

27. ∠R = 50°, ∠P = 60°, ∠Q = 70° **29.** PR = PR (common)

30. (i) RHS, ΔABC ≅ ΔRQP ; (ii) SAS, ΔQPR ≅ ΔABC ; (iii) SSS, ΔABC ≅ ΔZYX ; (iv) ASA; ΔPQR ≅ ΔPSR

31. Yes, by SAS, ΔPOQ ≅ ΔSOR **32.** (i) Yes, alternate angles, (ii) Yes, by SAS

33. (i) Yes, by ASA, (ii) Yes, corresponding parts of congruent triangles