EXERCISE 16.3 PAGE NO: 16.14

1. By applying SAS congruence condition, state which of the following pairs (Fig. 28) of triangle are congruent. State the result in symbolic form

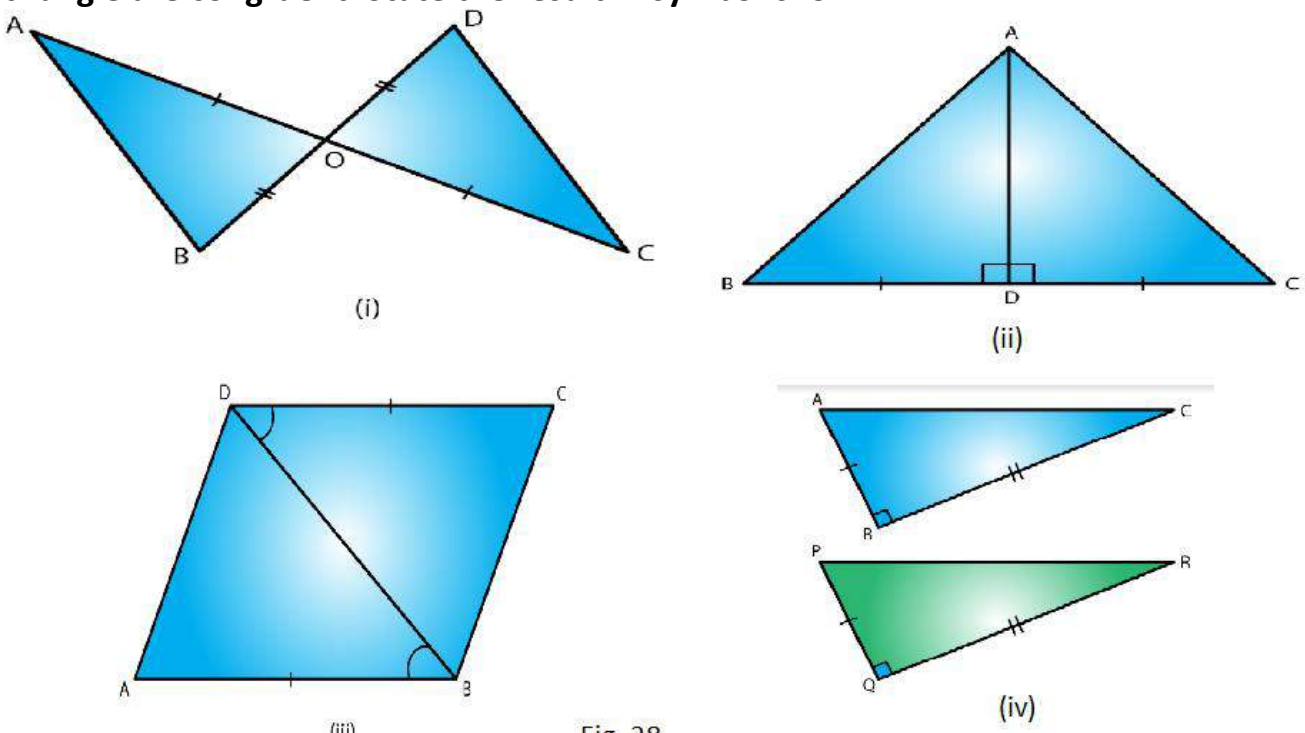

Fig. 28

Solution:

(i) From the figure we have OA = OC and OB = OD and
∠AOB = ∠COD which are vertically opposite angles.
Therefore by SAS condition, ΔAOC ≅ΔBOD

(ii) From the figure we have BD = DC
∠ADB = ∠ADC = 90^o and
Therefore, by SAS condition, ΔADB ≅ΔADC.

(iii) From the figure we have AB = DC
∠ABD = ∠CDB and
Therefore, by SAS condition, ΔABD ≅ΔCBD

(iv) We have BC = QR
ABC = PQR = 90^o
And AB = PQ

Therefore, by SAS condition, ΔABC≅ ΔPQR.

2. State the condition by which the following pairs of triangles are congruent.

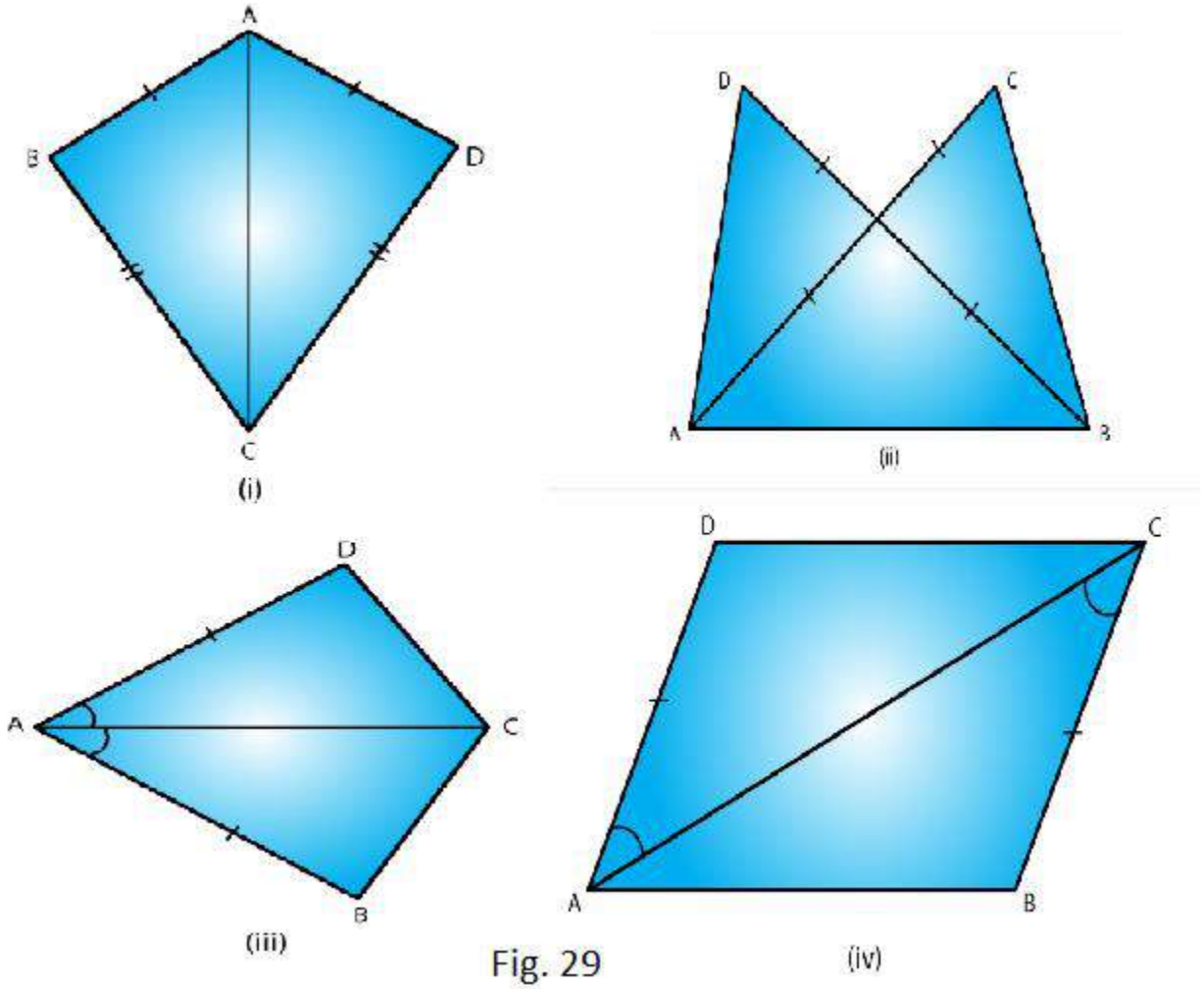

Fig. 29

Solution:

(i) AB = AD

BC = CD and AC = CA

Therefore by SSS condition, ΔABC≅ ΔADC

(ii) AC = BD

AD = BC and AB = BA

Therefore, by SSS condition, ΔABD ≅ ΔADC

(iii) AB = AD

∠BAC = ∠DAC and

Therefore by SAS condition, ΔBAC ≅ ΔBAC

(iv) AD = BC
∠DAC = ∠BCA and
Therefore, by SAS condition, ΔABC ≅ ΔADC

3. In fig. 30, line segments AB and CD bisect each other at O. Which of the following statements is true?
(i) ΔAOC ≅ ΔDOB
(ii) ΔAOC ≅ ΔBOD
(iii) ΔAOC ≅ ΔODB
State the three pairs of matching parts, you have used to arrive at the answer.

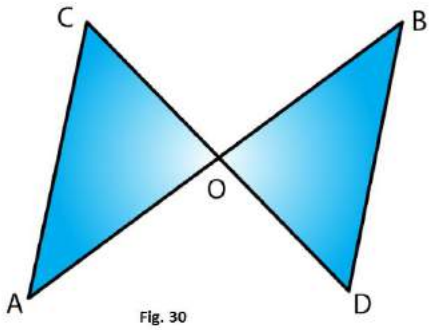

Fig. 30

Solution:
From the figure we have,
And, CO = OD
Also, AOC = BOD
Therefore, by SAS condition, ΔAOC ≅ ΔBOD

4. Line-segments AB and CD bisect each other at O. AC and BD are joined forming triangles AOC and BOD. State the three equality relations between the parts of the two triangles that are given or otherwise known. Are the two triangles congruent? State in symbolic form, which congruence condition do you use?

Solution:
We have AO = OB and CO = OD
Since AB and CD bisect each other at 0.
Also ∠AOC = ∠BOD
Since they are opposite angles on the same vertex.
Therefore by SAS congruence condition, ΔAOC ≅ ΔBOD

5. ΔABC is isosceles with AB = AC. Line segment AD bisects ∠A and meets the base BC in D.

(i) Is ΔADB ≅ ΔADC?
(ii) State the three pairs of matching parts used to answer (i).
(iii) Is it true to say that BD = DC?

Solution:
(i) We have AB = AC (Given)
∠BAD = ∠CAD (AD bisects ∠BAC)
Therefore by SAS condition of congruence, ΔABD ≅ ΔACD

(ii) We have used AB, AC; ∠BAD = ∠CAD; AD, DA.

(iii) Now, ΔABD≅ΔACD
Therefore by corresponding parts of congruent triangles
BD = DC.

6. In Fig. 31, AB = AD and ∠BAC = ∠DAC.
(i) State in symbolic form the congruence of two triangles ABC and ADC that is true.
(ii) Complete each of the following, so as to make it true:
(a) ∠ABC =
(b) ∠ACD =
(c) Line segment AC bisects ….. And ……..

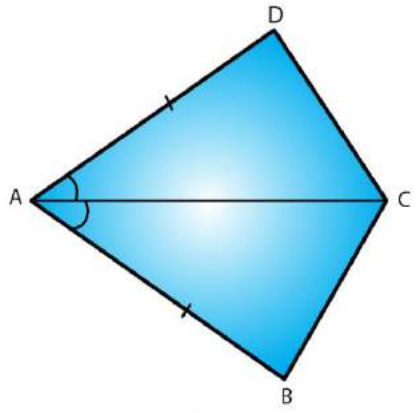

Fig. 31

Solution:
i) AB = AD (given)

∠BAC = ∠DAC (given)
AC = CA (common)
Therefore by SAS condition of congruency, ΔABC ≅ ΔADC
ii) ∠ABC = ∠ADC (corresponding parts of congruent triangles)
∠ACD = ∠ACB (corresponding parts of congruent triangles)

7. In fig. 32, AB || DC and AB = DC.
(i) Is ΔACD ≅ ΔCAB?
(ii) State the three pairs of matching parts used to answer (i).
(iii) Which angle is equal to ∠CAD?
(iv) Does it follow from (iii) that AD || BC?

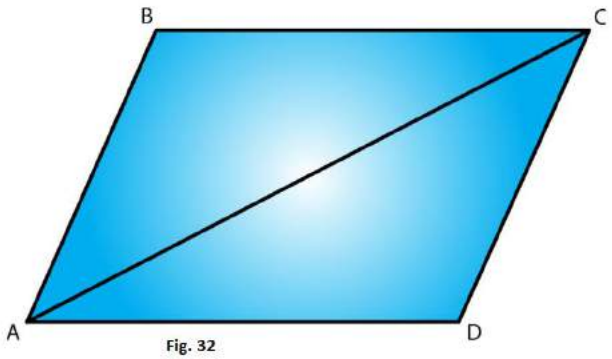

Fig. 32

Solution:
(i) Yes by SAS condition of congruency, ΔDCA ≅ ΔBAC

(ii) We have used AB = DC, AC = CA and ∠DCA = ∠BAC.

(iii) ∠CAD = ∠ACB since the two triangles are congruent.

(iv) Yes this follows from AD parallel to BC as alternate angles are equal. lf alternate angles are equal the lines are parallel