

Congruence of Triangles

Exercise 12-1

1.

$$AB = FE$$

$$\angle A = \angle F$$

$$BC = ED$$

$$\angle B = \angle E$$

$$AC = FD$$

$$\angle C = \angle D$$

2.

i) $\angle C$

ii) \overline{CA}

iii) $\angle A$

iv) \overline{BA}

3. i)

$$\overline{BC} = \overline{PR}$$

$$\overline{AB} = \overline{QP}$$

$$\overline{AC} = \overline{QR}$$

By using SSS Congruency rule

\therefore

$$\triangle ABC \cong \triangle QPR$$

(ii)

$$\overline{QR} \neq \overline{AB}$$

$$\overline{PR} = \overline{AC}$$

$$\overline{PQ} = \overline{BC}$$

As one side is not equal both are not congruent.

4.

(i) In $\triangle ABD$, $\triangle ACD$

$$\overline{AB} = \overline{AC}$$

$$\overline{AD} = \overline{AD}$$

$$\overline{BD} = \overline{CD}$$

(ii) By SSS Triangle Congruency

$$\triangle ABD \cong \triangle ADC$$

(iii) $\angle B = \angle C$ (\because Corresponding Congruent parts)

5.

(i)

$$\overline{AB} = \overline{AC}$$

$$\overline{AD} = \overline{AD}$$

$$\overline{BD} = \overline{CD} \quad (\because D \text{ is mid point of } BC)$$

(ii)

By SSS Triangle Congruency

$$\triangle ADB \cong \triangle ADC$$

(iii)

$\angle B = \angle C$ (\because Corresponding Congruent parts).

6.

(i)

$$\overline{AB} = \overline{DE}$$

$$\overline{AC} = \overline{DF}$$

$$\angle A \neq \angle D$$

\therefore Triangles are not Congruent.

(ii)

$$\overline{AC} = \overline{RP}$$

$$\overline{BC} = \overline{QP}$$

$$\angle C = \angle P$$

By SAS Congruency

$$\triangle ABC \cong \triangle RPQ$$

(iii)

$$\overline{DF} = \overline{PQ}$$

$$\overline{EF} = \overline{RQ}$$

$$\angle F = \angle Q$$

By SAS Congruency

$$\triangle DEF \cong \triangle PRQ$$

(iv)

$$\overline{AB} = \overline{PR}$$

$$\overline{BC} = \overline{QR}$$

$$\angle B = \angle R = 80^\circ \text{ (but They are not Congruent part)}$$

So given triangles are not Congruent.

7.

$$\angle P = \angle F$$

8.

a)

$$i) AR = PE$$

$$ii) RT = EN$$

$$iii) AT = PN$$

b)

$$i) RT = EN$$

$$ii) PN = AT$$

9.

i) Given

ii) Given

iii) Common side

iv) SAS Rule of Congruency.

10.

i)

$$\overline{RS} = \overline{PA}$$

$$\angle R = \angle P$$

$$\overline{PR} = \overline{RP}$$

ii) By SAS Congruency

$$\triangle PSR \cong \triangle RQP$$

iii) Yes, Congruent parts

iv) Yes, Congruent parts

11.

$$\begin{aligned} \text{i)} \quad & \overline{AB} = \overline{DC} \\ & \angle B = \angle C \\ & \overline{BC} = \overline{CB} \end{aligned}$$

ii) Yes, By SAS Congruency of triangle.

iii) Yes, Congruent parts are equal.

12.

$$\begin{aligned} \text{i)} \quad & \overline{AC} = \overline{AD} \\ \text{ii)} \quad & \angle A = \angle A \\ & \overline{AB} = \overline{AB} \end{aligned}$$

iii) Yes, $\triangle ABC \cong \triangle ABD$ By SAS Congruency.

iv) Yes, Congruent parts.

v) Yes, Congruent parts.

Exercise 12.2

1. $\overline{DF} = \overline{MP}$

2. $\triangle RAT \cong \triangle WON$

3. $\angle A = \angle P$

If two angles are equal third angle should equal because sum of angles in triangle equal to 180°

4. i) No, They are not congruent

ii) \rightarrow

4. i) Yes, $\triangle DEF \cong \triangle QPR$ by ASA Congruence rule.

ii) No, Not congruent

iii) No, Not congruent

5.

i) $\angle A = \angle B = 30^\circ$

$\angle BAC = \angle ABD = 30^\circ$

$\angle CBA = \angle DAB = 75^\circ$

$\overline{AB} = \overline{BA}$

ii) Yes, By ASA Congruency

iii) Yes, By congruent parts

6. i) $\angle BAC = \angle DAC$
 $\angle BCA = \angle DCA$
 $\angle ADC = \angle ABE$
 $\overline{AC} = \overline{AC}$

ii) Yes, By ASA Congruency.

iii) Yes, By Congruent parts

iv) Yes, By Congruent parts

7.

$$\overline{BC} = \overline{ED}$$

$$\angle ABC = \angle DEF$$

$$\angle BAC = \angle FED$$

By ASA Congruency, $\triangle ABC \cong \triangle FED$

8. (i) ~~No~~ Yes, $\triangle ABC \cong \triangle RPQ$

(ii) No

9. i)

$$\overline{PA} = \overline{PR}$$

$$\angle PSA = \angle PSR = 90^\circ$$

$$\overline{PS} = \overline{PS}$$

ii) By ASA rule $\triangle PAS \cong \triangle PRS$

$$\triangle PAS \cong \triangle PRS$$

iii) Yes, By Congruent parts

$$\overline{AS} = \overline{SR}$$

\therefore 'S' is mid-point of \overline{AR}

10.

$$\angle AOC = \angle BOD$$

$$\therefore \overline{AO} = \overline{OB}$$

$$\angle CAO = \angle DBO$$

By ASA Congruency

$$\triangle AOC \cong \triangle BOD$$

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