Grade-8 (BLE) Exam

Topic :- Geometry (15 Marks)

Imp. questions-2082

For Q.N. 9, 10 and 11

Congruency & Similarity

Congruent

When two triangles have the same and size, they are called congruent. It is denoted by the symbol '$\cong$'.

Test of congruent triangles

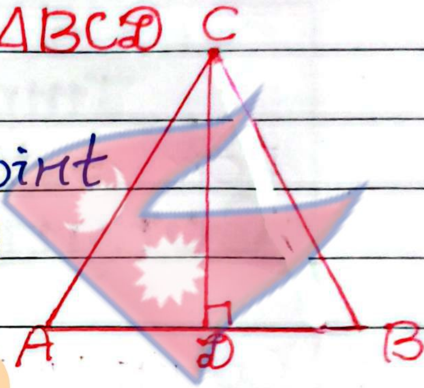
1. Side-Angle-Side (SAS)
2. Angle-Side-Angle (ASA)
3. Side-Side-Side (SSS)
4. Angle-Angle-Side (AAS)
5. Right angle hypotenuse Side (RHS)

Similar

Two plane figure are said to similar if they have the same shape. It is denoted by the symbol '$\sim$'.

WI

Q. 1. In the adjoining figure, D is the midpoint of AB. CD is perpendicular to AB.
prove that: $\Delta ACD \cong \Delta BCD$



⇒ Soln.

Given:- D is the mid-point of AB, $CD \perp AB$

To prove:- $\Delta ACD \cong \Delta BCD$

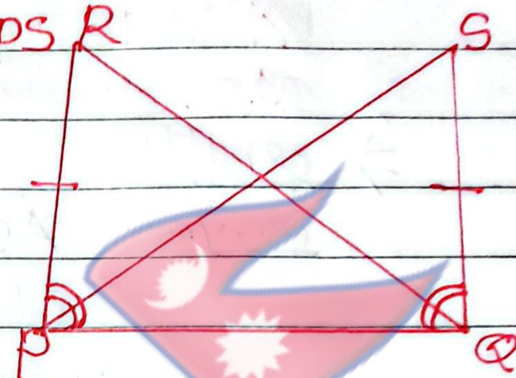
proof :-

Statement	Reason
1. AD = BD (S)	1. Mid-point D divides AB into equal parts.
2. $\angle ADC = \angle BDC$ (A)	2. $CD \perp AB$
3. CD = CD (S)	3. Common side
4. $\Delta ACD \cong \Delta BCD$	4. By SAS congruence rule

proved

VVI

2. In the figure, $\angle RPQ = \angle PQS$ and $QS = PR$.
prove that:- $\triangle PQR \cong \triangle QPS$



⇒ Soln.

Given:- $\angle RPQ = \angle PQS$
and $QS = PR$

To prove:- $\triangle PQR \cong \triangle QPS$

proof:-

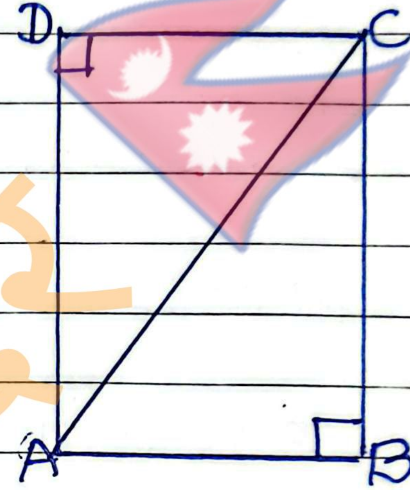
Statement	Reason
1. $QS = PR$ (S)	1. Given
2. $\angle RPQ = \angle PQS$ (A)	2. Given
3. $PQ = PQ$ (S)	3. Common side
4. $\triangle PQR \cong \triangle QPS$	4. By SAS congruence rule

proved

3. In a rectangle ABCD, prove that triangle $\triangle ABC$ is congruent to $\triangle ACD$ by drawing a diagonal AC.

→ Soln.

Given:- ABCD is a rectangle with diagonal AC.



To prove:- $\triangle ABC \cong \triangle ACD$

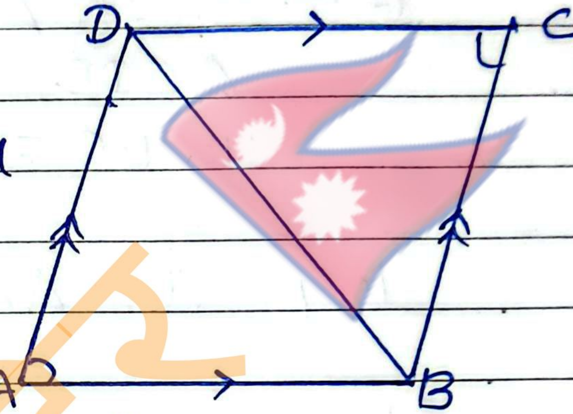
proof:-

Statement	Reason
1. $AB = CD$ & $AD = BC$ (S)	1. Opposite sides of rectangle
2. $\angle ABC = \angle ADC$ (A)	2. All the angles of rectangle are equal to $90°$
3. $AC = AC$ (S)	3. Common side
4. $\triangle ABC \cong \triangle ACD$	4. By SAS congruence rule

proved

4. Draw a diagonal BD in the parallelogram ABCD and prove that:- $\triangle ABD \cong \triangle CBD$.
[PABSON pre-BLE 2082]

⇒ Soln



Given:- ABCD is a parallelogram and BD is a diagonal.

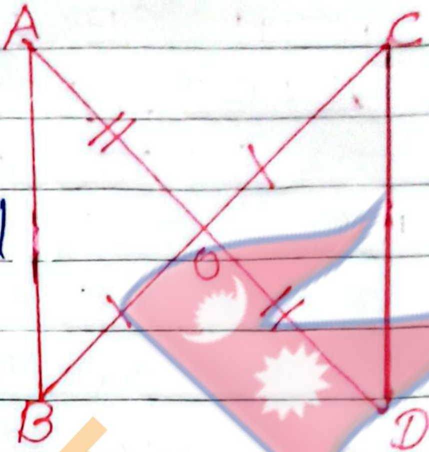
To prove:- $\triangle ABD \cong \triangle CBD$

Proof:-

Statement	Reason
1. $AB = CD$ & $BC = AD$ (S)	1. Opposite sides of parallelogram
2. $\angle DAB = \angle DCB$ (A)	2. opposite angle of parallelogram
3. $BD = BD$ (S)	3. Common side
4. $\triangle ABD \cong \triangle CBD$	4. By SAS Congruence rule

proved

VVI 5. In the figure, if AO = OD and BO = OC, prove that: $\triangle ABO \cong \triangle ODC$.



⇒ Soln.

Given:- In $\triangle ABO$ and $\triangle ODC$, $AO = OD$ and $BO = OC$

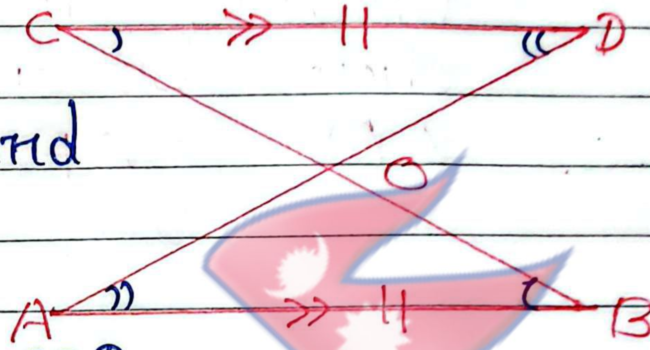
To prove:- $\triangle ABO \cong \triangle ODC$

Proof:-

Statement	Reason
1. $BO = OC$ (S)	1. Given
2. $\angle AOB = \angle COD$ (A)	2. Vertically opposite angle
3. $AO = OD$ (S)	3. Given
4. $\triangle ABO \cong \triangle ODC$	4. By SAS congruency rule

proved

6. In the given figure, AB = CD and AB ∥ CD prove that:-
$\Delta AOB \cong \Delta COD$

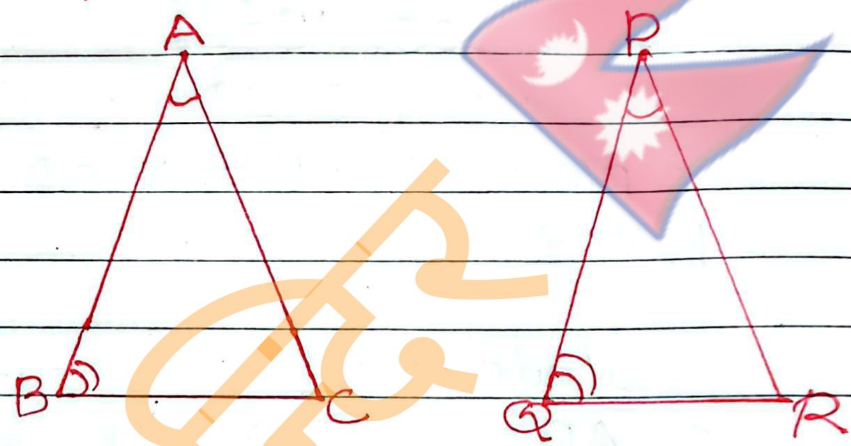


⇒ Soln.
Given:- In ΔAOB and ΔCOD, AB = CD and AB ∥ CD
To prove:- $\Delta AOB \cong \Delta COD$
Proof:-

Statement	Reason
1. AB = CD (S)	1. Given
2. ∡COD = ∡AOB (A)	2. Vertically opposite angle
3. ∡ABC = ∡BCD & ∡ADC = ∡BAD (A)	3. Alternate angle
4. Δ AOB = ΔCOD	4. By ASA congruence rule

proved

7. In ΔABC and ΔPQR, $\angle BAC = \angle QPR$ and $\angle ABC = \angle PQR$.
Which of the given conditions should be added to make $\Delta ABC \cong \Delta PQR$?



Soln.

Given:- In ΔABC and ΔPQR,
$\angle ABC = \angle PQR$ and $\angle BAC = \angle QPR$

To prove:- $\Delta ABC \cong \Delta PQR$

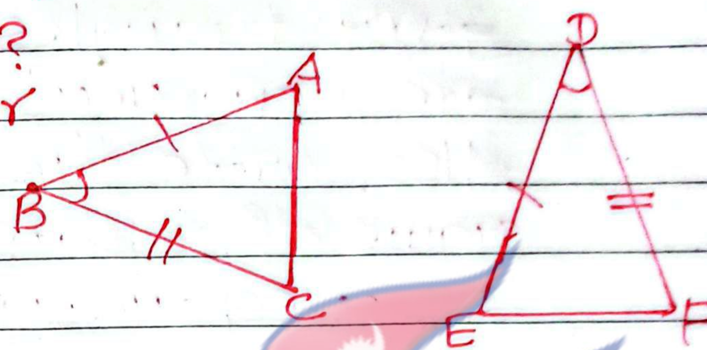
Condition to be Added:- $AB = PQ$

Proof:-

Statement	Reason
1. $\angle ABC = \angle PQR$ (A)	1. Given
2. $\angle BAC = \angle QPR$ (A)	2. Given
3. $AB = PQ$ (S)	3. Condition Added
4. $\Delta ABC \cong \Delta PQR$	4. By SAS Congruence rule.

proved

8. By which axiom, $\triangle ABC$ and $\triangle DEF$ are congruent? Also, write a pair of corresponding angles.
[BLE-2081]



⇒ Soln.

Here,

In $\triangle ABC$ and $\triangle DEF$

$AB = DE$ (S)

$DF = BC$ (S)

$\angle ABC = \angle EDF$ (A)

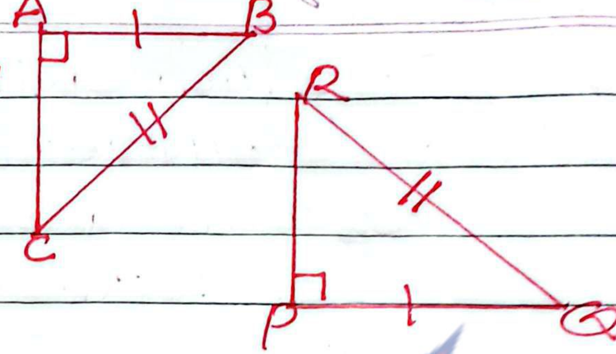
So, by SAS congruency rule, $\triangle ABC$ and $\triangle DEF$ are congruent.

Also,

A pair of corresponding angles are:-

$\angle ABC$ and $\angle EDF$.

9. By which axiom given triangles are congruent? Also, write the name of a pair of corresponding angles.



⇒ Soln.

Here,

In $\triangle ABC$ and $\triangle PQR$,

$\angle BAC = \angle QPR$ (R)

$BC = QR$ (H)

$AB = PQ$ (S)

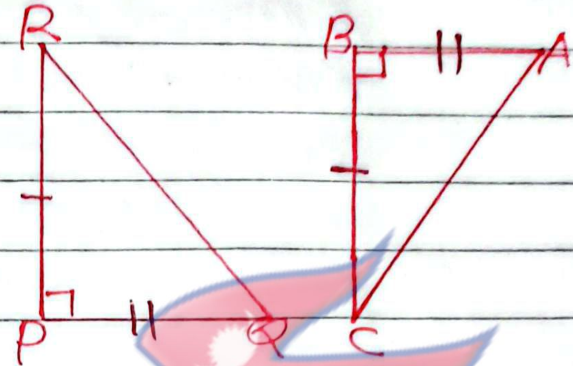
By RHS axiom, $\triangle ABC$ and $\triangle PQR$ are congruent.

Also,

The name of a pair of corresponding angles are:-

$\angle BAC$ and $\angle QPR$

10. In the figure, $\angle RPQ = \angle ABC$, $PR = BC$ and $PQ = AB$, prove that:- ΔPQR and ΔABC are congruent.



⇒ Soln.

Given:- In ΔPQR and ΔABC, $\angle RPQ = \angle ABC$, $PR = BC$, and $PQ = AB$

To prove:- $\Delta PQR \cong \Delta ABC$

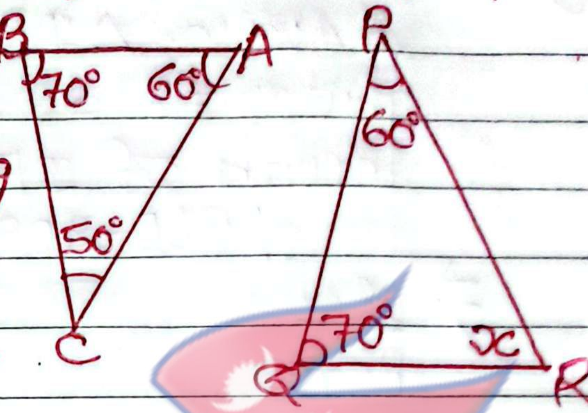
Proof:-

Statement	Reason
1. $\angle RPQ = \angle ABC = 90°$ (A)	1. Given
2. $PR = BC$ (S)	2. Given
3. $PQ = AB$ (S)	3. Given
4. $\Delta PQR \cong \Delta ABC$	4. By SAS congruence rule

proved

[Note:- You can also prove it by RHS rule]

11. In the given figure, $\Delta ABC \sim \Delta PQR$ then,



(a) Write down the name of corresponding angles and sides.

(b) Find the value of x.

⇒ Soln.

Here,

$\Delta ABC \sim \Delta PQR$,

(a) The corresponding angles are:-

* $\angle A$ and $\angle P$
* $\angle B$ and $\angle Q$
* $\angle C$ and $\angle R$

The corresponding sides are:-

* AB and PQ
* BC and QR
* AC and PR

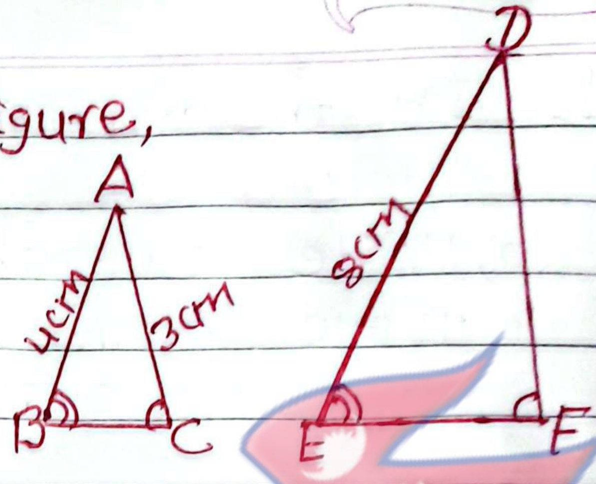
(b) Here,

$\angle R = \angle C$

$\therefore x = 50°$

Thus, the value of x is 50°.

12. In the given figure, $\triangle ABC \sim \triangle DEF$, then find the length of DF
[BLE-2081]



⇒ Soln.

Here,

$\triangle ABC \sim \triangle DEF$ and $\angle B = \angle E$, $\angle C = \angle F$

Now,

$\frac{AB}{DE} = \frac{AC}{DF}$ [$\because$ Corresponding sides of similar triangles are proportional]

or, $\frac{4}{8} = \frac{3}{DF}$

or, $DF \times 4 = 3 \times 8$

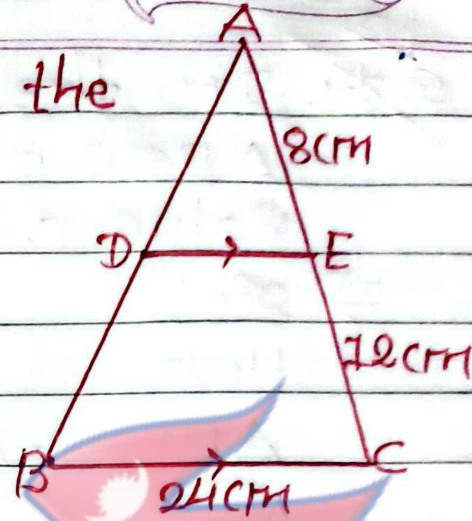
or, $DF = \frac{24}{4}$

$\therefore DF = 6cm$

Thus, the length of DF is 6cm.

VVI

Q.13. If $\Delta ADE \sim \Delta ABC$, find the length of DE.
[BLE-2081]



⇒ Soln.

Here,

$\Delta ABC \sim \Delta ADE$ and

$BC \parallel DE$

Now,

$\frac{AC}{AE} = \frac{BC}{DE}$ [∵ Corresponding sides of similar triangles are proportional]

or, $\frac{(12+8)}{8} = \frac{24}{DE}$

or, $20 \times DE = 24 \times 8$

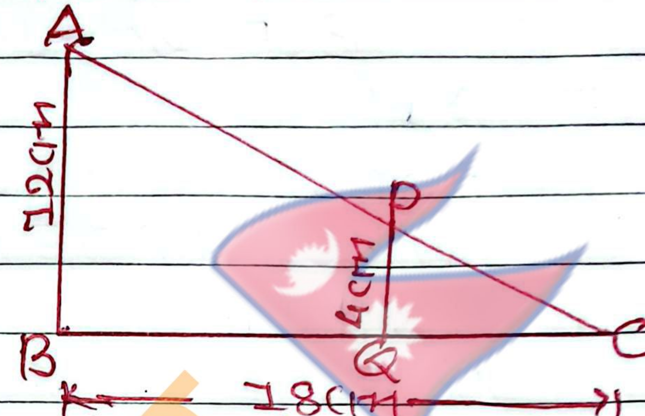
or, $DE = \frac{192}{20}$

∴ $DE = 9.6\text{cm}$

Thus, the length of DE is 9.6cm

VVI

Q. ~~14~~. In the given figure if $\Delta PQC \sim \Delta ABC$, find the value of QC.



⇒ Soln.

Here,

$\Delta PQC \sim \Delta ABC$

Now,

$\frac{AB}{PQ} = \frac{BC}{QC}$ [∵ corresponding sides of similar triangles are proportional]

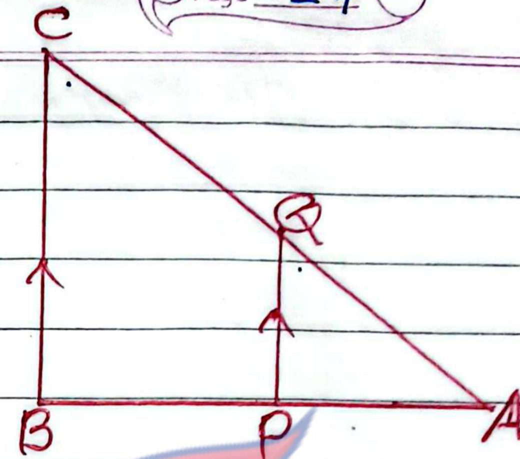
or, $\frac{12}{4} = \frac{18}{QC}$

or, $QC \times 12 = 18 \times 4$

or, $QC = \frac{72}{12}$

∴ $QC = 6cm$

Thus,
the value of QC is 6cm.



Q.15 In the given figure, $BC \parallel PQ$. show that $\Delta ABC \sim \Delta APQ$.

→ Sol^n.

Given:- In ΔABC and ΔAPQ, $BC \parallel PQ$

To prove:- $\Delta ABC \sim \Delta APQ$

proof :-

Statement	Reason
1. $\angle PQA = \angle BCA$ (A)	1. Corresponding angle ($BC \parallel PQ$)
2. $\angle QPA = \angle CBA$ (A)	2. Corresponding angle ($BC \parallel PQ$)
3. $\Delta ABC \sim \Delta APQ$	3. By AA rule

proved