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Merging man and maths

Exercise 10.3 (Solutions)

Mathematics 9th (Science)
Punjab Textbook Board



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برائے مہربانی نوٹس کابی اور استعمال کرتے وقت اس لائیسنس کا خیال رکھیں۔

Q.1 In the figure, $\overline{AB} \cong \overline{DC}$, $\overline{AD} \cong \overline{BC}$.

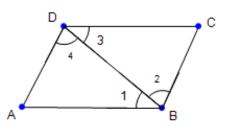
Prove that $\angle A \cong \angle C$, $\angle ABC \cong \angle ADC$.

Solution: Given: In quadrilateral

ABCD, $\overline{AB} \cong \overline{DC}$, $\overline{AD} \cong \overline{BC}$.

To prove:

 $\angle A \cong \angle C$ and $\angle ABC \cong \angle ADC$.



Proof:

Statement	Reasons
In $\triangle ABD \leftrightarrow \triangle CDB$	
$\overline{AB} \cong \overline{DC}$	Given
$\overline{AD} \cong \overline{BC}$	Given
$\overline{BD} \cong \overline{BD}$	Common
$\triangle ABD \cong \triangle CDB$	$S.S.S \cong S.S.S$
Hence $\angle A \cong \angle C$	Corresponding angles of congruent triangles
$m\angle 1 = m\angle 3$	Corresponding angles of congruent triangles
$m\angle 2 = m\angle 4$	Corresponding angles of congruent triangles
$m\angle 1 + m\angle 2 = m\angle 3 + m\angle 4$	
or $m\angle ABC = m\angle ADC$	
$\angle ABC \cong \angle ADC$	

Q.2 In the figure,

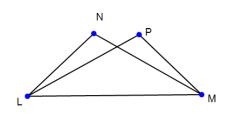
$$\overline{LN} \cong \overline{MP}, \ \overline{MN} \cong \overline{LP}.$$

Prove that $\angle N \cong \angle P$, $\angle NML \cong \angle PLM$,

Solution: Given: $\overline{LN} \cong \overline{PM}$ and

 $\overline{LP} \cong \overline{MN}$

To prove: $\angle N \cong \angle P$ and $\angle NML \cong \angle PLM$



Proof:

Statement	Reasons
In $\Delta LMN \leftrightarrow \Delta MLP$	
$\overline{LN}\cong\overline{MP}$	Given
$\overline{LP}\cong\overline{MN}$	Given
$\overline{LM}\cong\overline{ML}$	common
$\Delta LMN \cong \Delta MLP$	$S.S.S \cong S.S.S$
$\angle N \cong \angle P$	Corresponding angles of
	congruent triangles
∠NML≅∠PLM	Corresponding angles of
	congruent triangles

Q.3 Prove that the median bisecting the base of an isosceles triangle bisects the vertex angle and it is perpendicular to the base.

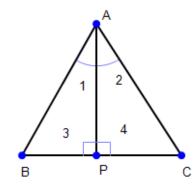
Solution: Given: In $\triangle ABC$,

- (i) $\overline{AB} \cong \overline{AC}$
- (ii) P is the mid-point of

$$\overline{BC}$$
 i.e $\overline{BP} = \overline{CP}$

P is joining A i.e \overline{AP} is median

To prove: $\angle 1 \cong \angle 2$ and $\overline{AP} \perp \overline{BC}$



Proof:

Statement	Reasons
In $\triangle ABP \leftrightarrow \triangle ACP$	
$\overline{AB} \cong \overline{AC}$	Given
$\overline{BP} \cong \overline{CP}$	Given
$\overline{AP}\cong \overline{AP}$	Common
$\triangle ABP \cong \triangle ACP$	$S.S.S \cong S.S.S$
∠1 ≅ ∠2	Corresponding angles of
∠3≅ ∠4	congruent triangles Corresponding angles of congruent triangles
$m \angle 3 = m \angle 4$ (i)	
$m \angle 3 + m \angle 4 = 180^{\circ}$	Sum of supplementary angles
$2(m\angle 4) = 180^{\circ}$	From equation (i) and (ii)
<i>m</i> ∠4 = 90°	
Thus $m \angle 3 = m \angle 4 = 90^{\circ}$	
So $\overline{AP} \perp \overline{BC}$	

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