4-2

Ex. 1 **Given:** $\Delta XYZ \cong \Delta XRQ$

Prove: $XZ = QX$
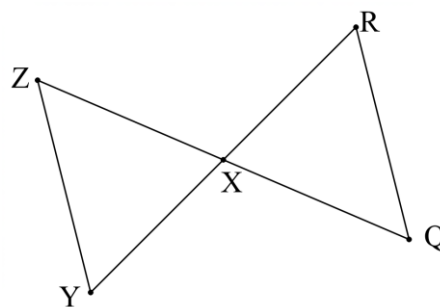
Statements	Reasons

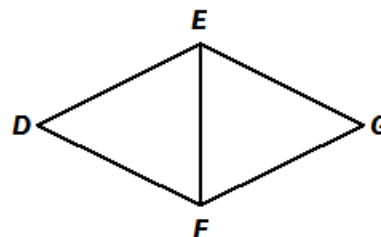**Ex. 2** **Given:** $\overline{DE} \cong \overline{GE}$, $\overline{DF} \cong \overline{GF}$,
$\angle D \cong \angle G$, $\angle DFE \cong \angle GFE$

Prove: $\Delta DEF \cong \Delta GEF$

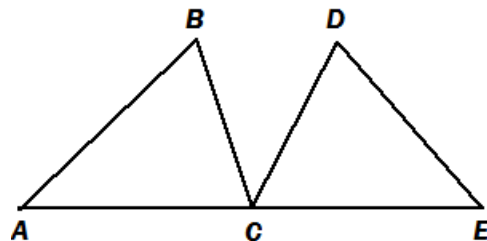| Statements	Reasons

Theorems/postulates/definitions that will be helpful to use in Proofs:

- Reflexive Property
- Transitive Property
- If vertical angles, then congruent
- If midpoint, then segment is divided into congruent segments
- If angle is bisected, then it is divided into two congruent angles
- If segment is bisected, then it is divided into two congruent segments
- If || lines, then alternate interior angles are congruent.
- If || lines, then corresponding angles are congruent.
- If ⊥ lines, then right angles are formed.
- If two angles are right angles, then they are congruent.
- CPCTC
- SSS
- SAS
- ASA
- AAS
- HL
- Isosceles Triangle Theorem (if two sides of a triangle are congruent, then the angles opposite those sides are congruent)
- Isosceles Triangle Converse (if two angles of a triangle are congruent, then the sides opposite those angles are congruent)
- Definition of Isosceles Triangle: If isosceles triangle, then legs are congruent.

4-3

Ex. 3   **Given:** $\overline{AB} \cong \overline{ED}, \overline{BC} \cong \overline{DC}$
C is the midpoint of $\overline{AE}$

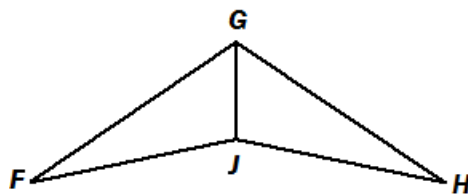**Prove:** $\triangle ABC \cong \triangle EDC$

Statements	Reasons

Ex. 4   Given*: $\overline{FG} \cong \overline{HG}$,
             $\overline{JG}$ bisects $\angle FGH$

       Prove: $\Delta FGJ \cong \Delta HGJ$
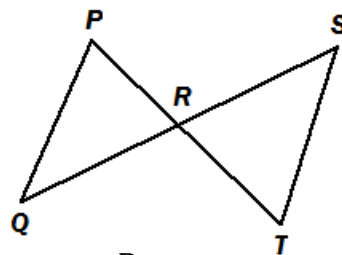
Statements	Reasons

Ex. 5   Given: R is the midpoint of $\overline{QS}$ and $\overline{PT}$.

       Prove: $\overline{PQ} \cong \overline{ST}$

Statements	Reasons

If time…

Ex. 6   **Given:** $\odot O, \overline{CD} \cong \overline{DE}$.

Prove: $\angle COD \cong \angle DOE$
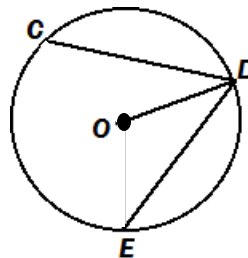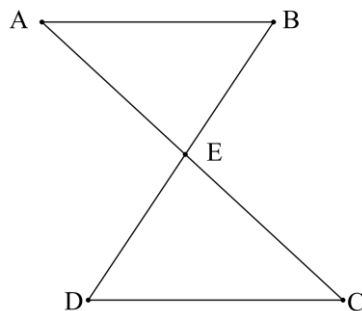
Statements	Reasons

4-4

Ex. 7   **Given:** $\overline{AB} \parallel \overline{CD}, \overline{AB} \cong \overline{CD}$.

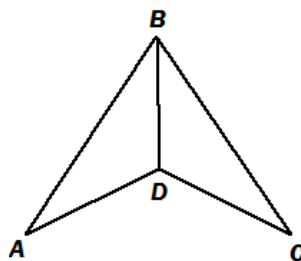**Prove:** $\overline{AE} \cong \overline{CE}$

Statements	Reasons

Ex. 8   **Given:** $\angle ADB \cong \angle CDB$,
$\overline{BD}$ bisects $\angle ABC$

      Prove: $\Delta ABD \cong \Delta CBD$

Statements	Reasons

Ex. 9   **Given:** $\overline{PM} \cong \overline{RM}$.
$\angle SPM \cong \angle ORM$

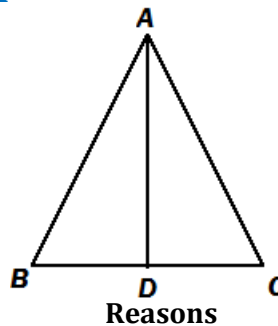   **Prove:** $\Delta PSM \cong \Delta ROM$
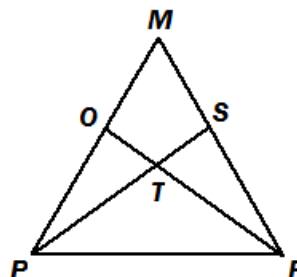
Statements	Reasons

Ex. 10 Given: $\overline{AD}$ bisects $\angle BAC$,
$\overline{AD} \perp \overline{BC}$

Prove: $\triangle ABD \cong \triangle ACD$
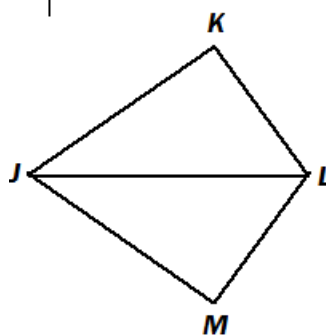
Statements	Reasons

Ex. 11 Given: $\angle K \cong \angle M, \overline{JK} \cong \overline{JM}$
$\overline{JL}$ bisects $\angle KLM$

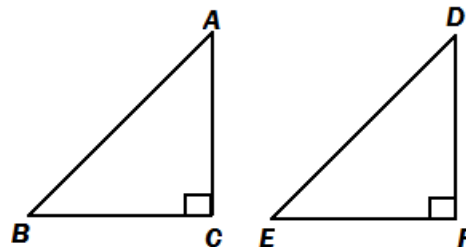**Prove:** $\overline{KL} \cong \overline{ML}$

Statements	Reasons

4-5

Proof of Theorem 4.9 (Hypotenuse-Leg (HL) Congruence):
   If the hypotenuse and leg of one right Δ are ≅ to the corresponding parts of another Δ, then the Δ's are ≅.

Given: ΔABC and ΔDEF are right Δs
$\overline{AB} \cong \overline{DE}, \; \overline{BC} \cong \overline{EF}$

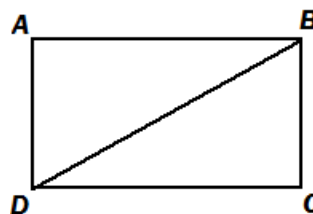**Prove:** $\Delta ABC \cong \Delta DEF$

Statements	Reasons

Ex. 12 Given: $\overline{AD} \perp \overline{AB}, \overline{CB} \perp \overline{CD}$
$\overline{AD} \cong \overline{CB}$
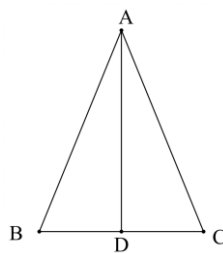
Prove: $\Delta DAB \cong \Delta BCD$

Statements	Reasons

Ex. 13 Given: $\overline{AD} \perp \overline{BC}$,
$\qquad\qquad \overline{BD} \cong \overline{CD}$

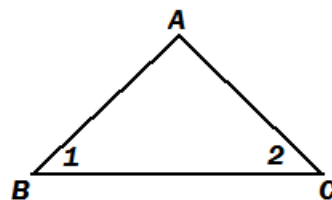**Prove:** $\triangle ABD \cong \triangle ACD$

A

B   D   C

Statements	Reasons

4-6

Proof of Theorem 4.6 (Isosceles Triangle Theorem):
If 2 sides of a △ are ≅, then the ∠'s opposite those sides are ≅.

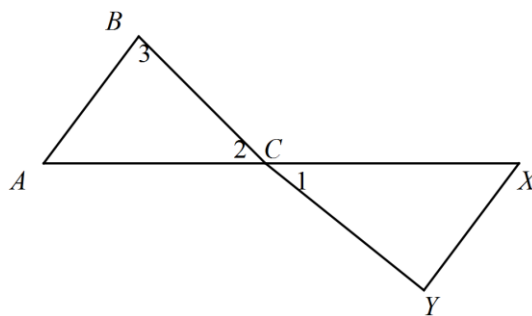*Given:* $\overline{AB} \cong \overline{AC}$

Prove: $\angle 2 \cong \angle 1$

A

1   2

B   C

statements	reasons

Ex. 14 Given: $\angle 1 \cong \angle 3$
         Prove: $\overline{AB} \cong \overline{AC}$

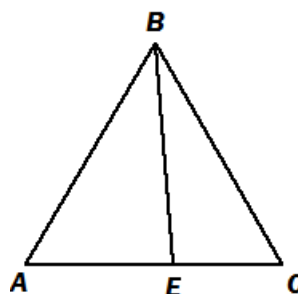| Statements	Reasons

Ex. 15 Given: $\triangle ABC$ is isosceles with base $\overline{AC}$
              $\overline{EB}$ bisects $\overline{AC}$

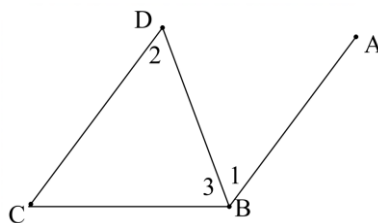   **Prove:** $\triangle ABE \cong \triangle CBE$

Statements	Reasons

Ex. 16 Given: $\overline{CD} \cong \overline{CB}$,
$\overline{CD} \parallel \overline{AB}$

Prove: $\angle 3 \cong \angle 1$

Statements	Reasons

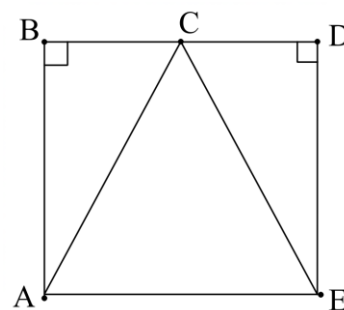**Ex. 17 Given:** $\overline{AB} \cong \overline{DE}$, $\angle B$ is a right angle; $\angle D$ is a right angle; C is the midpoint of $\overline{BC}$.

Prove: $\triangle ACE$ is isosceles.

Statements	Reasons