Proving Two Triangles are Congruent

SAA/AAS (Side-Angle-Angle) Theorem: If two angles and a non-included side of one triangle are congruent to the corresponding two angles and a non-induded side of another triangle, then the triangles are congruent.

Isosceles Triangle Theorem: If two sides of a triangle are congruent, then the angles opposite those sides are congruent.

Converse of Isosceles Triangle Theorem: If two angles of a triangle are congruent, then the sides opposite those angles are also congruent.

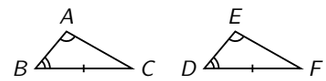
An equilateral triangle is also equiangular.

LL Congruence Theorem: If the legs of one right triangle are congruent to the legs of another right triangle, then the triangles are congruent.

LA (Leg-Acute angle) Congruence Theorem: If a leg and an acute angle of one right triangle are congruent to a leg and an acute angle of another right triangle, then the triangles are congruent.

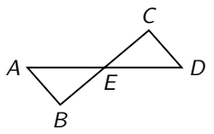
Practice Exercises

Complete the following proofs.

1. 

Given: $\angle A \cong \angle E$, $\angle B \cong \angle B$, $\overline{FG} \cong \overline{FG}$
Prove: $\triangle ABC \cong \triangle EDF$
Proof:

Statements	Reasons
1. $\angle A+\angle B+\angle C=180^\circ$ $\angle D+\angle E+\angle F=180^\circ$	1.
2. $\angle A+\angle B+\angle C=$ $\angle E+\angle D+\angle F$	2.
3. $\angle A=\angle E$, $\angle B=\angle D$	3.
4. $\angle C=\angle F$	4.
5. $\overline{BC} \cong \overline{DF}$	5.
6. $\triangle ABC \cong \triangle EDF$	6.

2. 

Given: E is the midpoint of segments AD and BC.
Prove: $\triangle AEB \cong \triangle DEC$
Proof:

Statements	Reasons
1. E is the midpoint of segments AD and BC.	1.
2. $\overline{AE} \cong \overline{DE}$	2.
3. $\angle AEB \cong \angle DEC$	3.
4. $\overline{BE} \cong \overline{CE}$	4.
5. $\triangle AEB \cong \triangle DEC$	5.

Problem Set

Complete the following proof.

Given: $\overline{FN} \perp \overline{EI}$, $\overline{FN}$ bisects $\angle EFI$
Prove: $\triangle FNI \cong \triangle FNE$
Proof:

Statements	Reasons
1. $\overline{FN} \perp \overline{EI}$	1.
2. $\angle FNI = 90^\circ$, $\angle FNE = 90^\circ$	2.
3. $\angle FNI \cong \angle FNE$	3.
4. $\overline{FN} \cong \overline{FN}$	4.
5. $\overline{FN}$ bisects $\angle EFI$	5.
6. $\angle EFN \cong \angle IFN$	6.
7. $\triangle FNI \cong \triangle FNE$	7.

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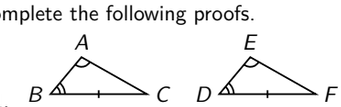
1. 

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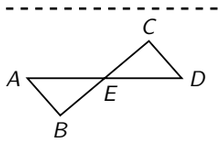
2. 

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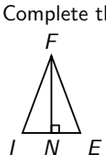

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