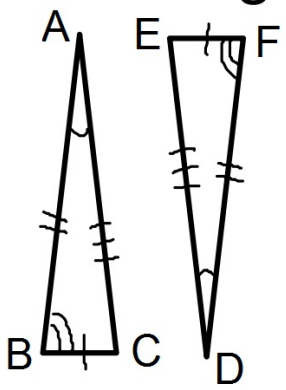
Bellwork

Write a congruence statement for each of the following:

1.

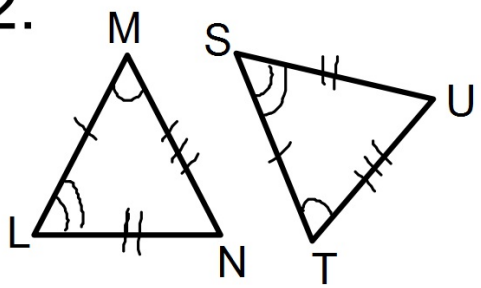


$\angle A \cong \angle D$
$\angle B \cong \angle F$
$\angle C \cong \angle E$

$\overline{AB} \cong \overline{DF}$
$\overline{AC} \cong \overline{DE}$
$\overline{BC} \cong \overline{EF}$

$\triangle ABC \cong \triangle DFE$

2.



(1) $\angle L \cong \angle S$
(3) $\angle N \cong \angle U$
(2) $\angle M \cong \angle T$

$\overline{LM} \cong \overline{ST}$
$\overline{MN} \cong \overline{TU}$
$\overline{LN} \cong \overline{SU}$

$\triangle LMN \cong \triangle STU$

What is a Proof?

Definitions

Proof: A logical argument showing a statement is true.

2 Column Proof: A t-chart that has a list of statements on the left side, and the reason for them on the right side.

Paragraph Proof: A paragraph that tells how your statements and reasons instead of using a 2 column proof.

Essential Properties

Reflexive Property:

Real Numbers

For any a, a = a

Segment Lengths

For any AB, AB = AB

Angle Measurements

For any $\angle A$, m $\angle A$ = m $\angle A$

Essential Properties Cont.

Symmetric Property:

Real Numbers

For any real number a and b,

If a = b, then b = a

Segment Lengths

If AB = CD, then CD = AB

Angle Measurements

If m $\angle$A = m $\angle$B, then m $\angle$ B = m $\angle$A

Essential Properties Cont.

Transitive Property:

Real Numbers

If a = b and b = c, then a = c

Segment Lengths

If AB = CD and CD = EF, then AB = EF

Angle Measurements

If m $\angle$A = m $\angle$B and m $\angle$B = m $\angle$C, then m $\angle$A = m $\angle$C

Making a Two-Column Proof

Statements	Reasons
What can you use? Whatever you can provide a reason for. Need to show what is being asked for.	What can you use? Definitions Theorems Postulates Properties

Proving Triangle Congruence

Throughout this unit we will be focusing on several methods of proving two triangles are congruent including:

1. Side-Side-Side (SSS)
   [This is the main focus of this lesson]
2. Side-Angle Side (SAS)
3. Hypotenuse Leg (HL)
4. Angle-Side-Angle (ASA)
5. Angle-Angle-Side (AAS)

Side-Side-Side

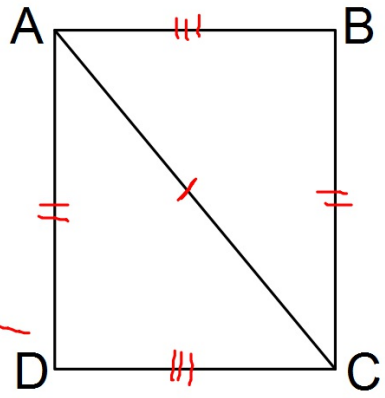
Side-Side-Side (SSS) Congruence Postulate:

IF 3 sides of one triangle are congruent to 3 sides of another triangle,

THEN the two triangles are congruent.

Example

1. **Given:** ABCD is a square.



Prove: $\triangle ACD \cong \triangle CAB$

Statements	Reasons
① ABCD is a □	① Given
② $\overline{AC} \cong \overline{AC}$ (S)	② Reflexive Prop.
③ $\overline{AD} \cong \overline{BC}$ (S) $\overline{AB} \cong \overline{DC}$ (S)	③ Def of a Square
④ $\triangle ACD \cong \triangle CAB$	④ SSS