Triangle Congruence Theorems

Side-Side-Side (SSS) Congruence Postulate

If three sides of one triangle are congruent to three sides of another triangle, then the triangles are congruent.

$\overline{QR} \cong \overline{TU}$, $\overline{RP} \cong \overline{US}$, and $\overline{PQ} \cong \overline{ST}$, so $\triangle PQR \cong \triangle STU$.

Side-Angle-Side (SAS) Congruence Postulate

If two sides and the included angle of one triangle are congruent to two sides and the included angle of another triangle, then the triangles are congruent.

$\angle K$ is the included angle of $\overline{HK}$ and $\overline{KJ}$.

$\angle N$ is the included angle of $\overline{LN}$ and $\overline{NM}$.

$\triangle HJK \cong \triangle LMN$

Angle-Side-Angle (ASA) Congruence Postulate

If two angles and the included side of one triangle are congruent to two angles and the included side of another triangle, then the triangles are congruent.

$\overline{AC}$ is the included side of $\angle A$ and $\angle C$.

$\overline{DF}$ is the included side of $\angle D$ and $\angle F$.

$\triangle ABC \cong \triangle DEF$

Angle-Angle-Side (AAS) Congruence Theorem

If two angles and a nonincluded side of one triangle are congruent to the corresponding angles and nonincluded side of another triangle, then the triangles are congruent.

$\overline{FH}$ is a nonincluded side of $\angle F$ and $\angle G$.

$\overline{JL}$ is a nonincluded side of $\angle J$ and $\angle K$.

$\triangle FGH \cong \triangle JKL$

Hypotenuse-Leg (HL) Congruence Theorem

If the hypotenuse and a leg of a right triangle are congruent to the hypotenuse and a leg of another right triangle, then the triangles are congruent.
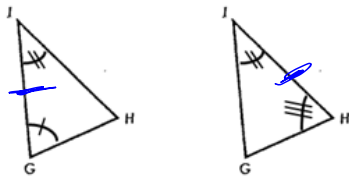
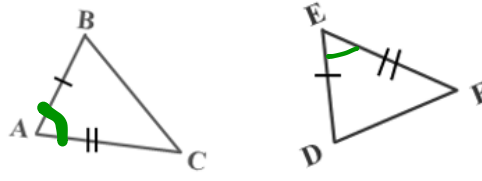$\triangle JKL \cong \triangle MNP$

The Big No-No:

Included Side	**Included Angle**
The side between two angles	The angle between two sides

Practice: Mark the included side in each triangle

Practice: Mark the included angle in each triangle.


Definition of Congruence

Two triangles are congruent to each other if and only if their corresponding angles and sides are congruent.
Corresponding parts of triangles are the parts of the congruent triangles that "match."

Example: If $\triangle RST \cong \triangle XYZ$ identify all pairs of congruent corresponding parts. Draw a picture and label the congruent angles and sides.

$RS \cong XY$
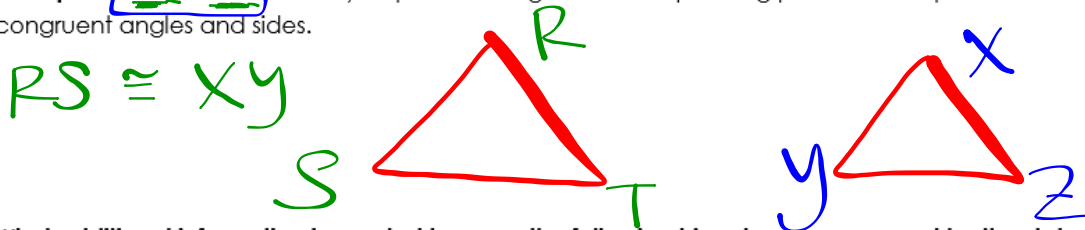
What additional information is needed to prove the following triangles are congruent by the stated theorem?

a. AAS

$EF \cong LK$

b. SAS

$JI \cong TS$

c. ASA

$\angle DUT = \angle SUT$
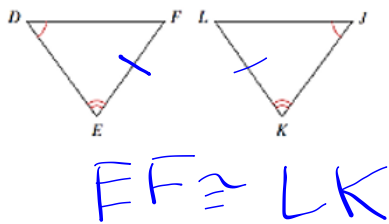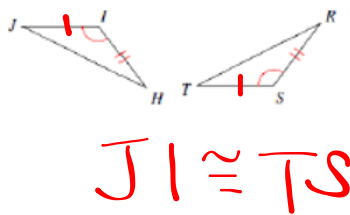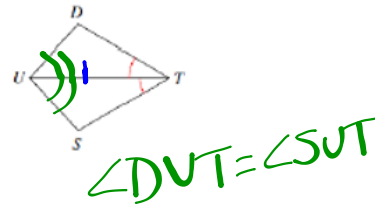
Practice: Mark the appropriate sides and angles to make each congruence statement true by the stated congruence theorem.
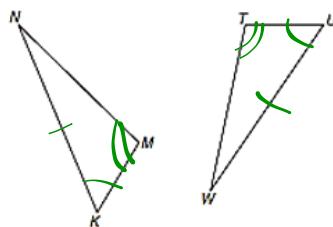
a. HL

$\triangle JFH \cong \triangle RMP$
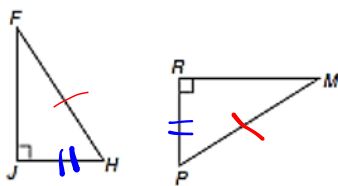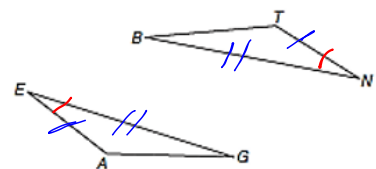
$FH \cong PM$

$JH \cong RP$
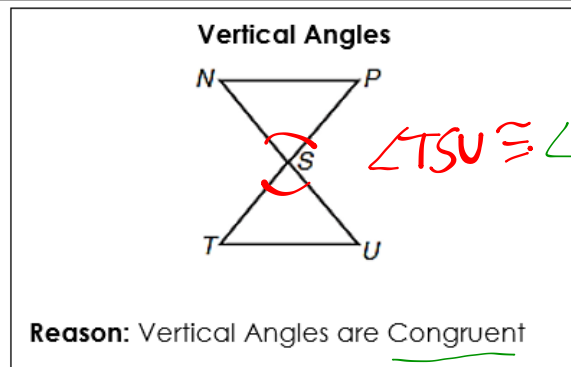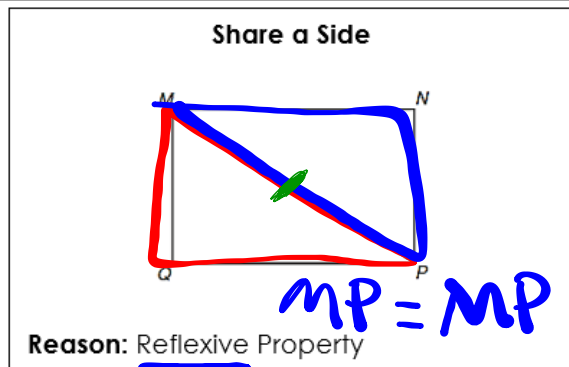
b. **AAS**

$\triangle NMK \cong \triangle WTU$

$\angle U = \angle K$
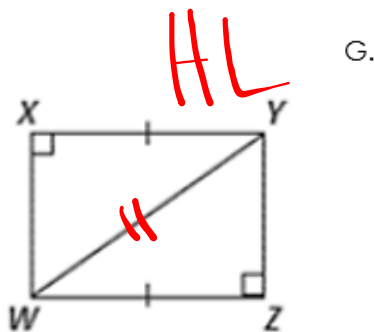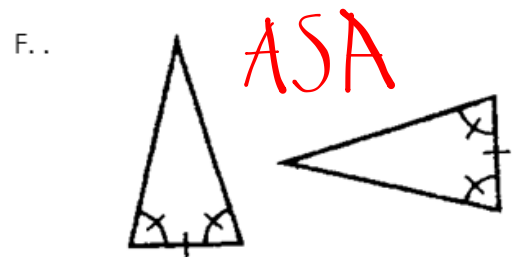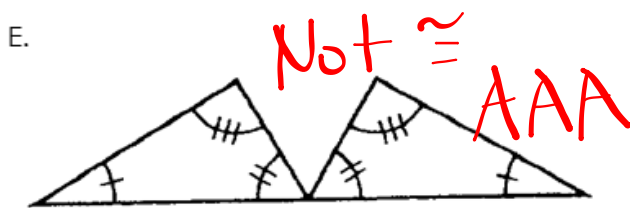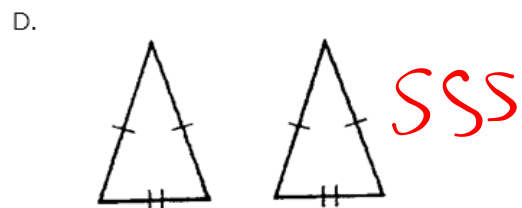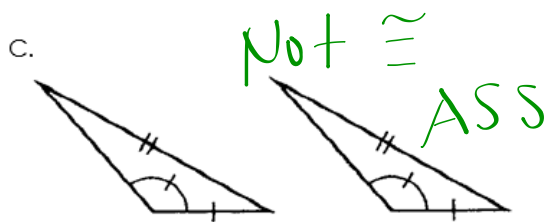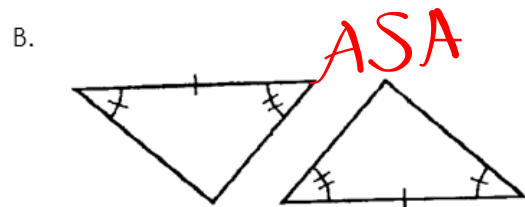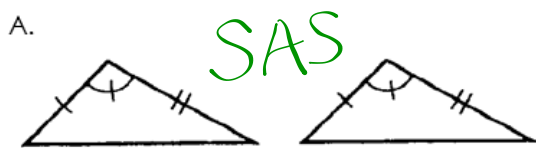
$\angle T = \angle M$

$UW = KN$

c. **SAS**

$\triangle EGA \cong \triangle NBT$

Markings You Are Allowed to Add... DON'T ASS+U+ME

Share a Side	Vertical Angles
$MP = MP$ **Reason:** Reflexive Property	$\angle TSU \cong \angle NSP$ **Reason:** Vertical Angles are Congruent

Practice: Determine whether there is enough information to conclude if the triangles are congruent. If so, state the congruence theorem. If not, write not enough information.

A. SAS

B. ASA

C. Not $\cong$ ASS

D. SSS

E. Not $\cong$ AAA

F. . ASA

G. HL

H. SAS

I.

SAS

J.

Not ≅
ASS

K.

ASA

L.

Not ≅

∠
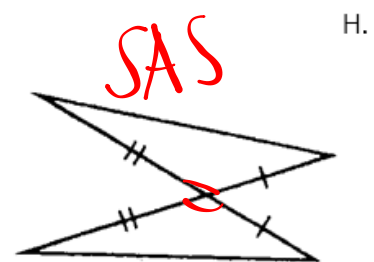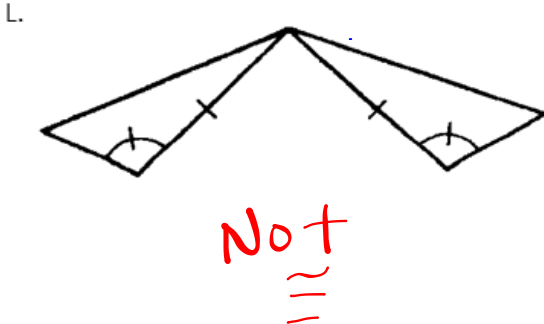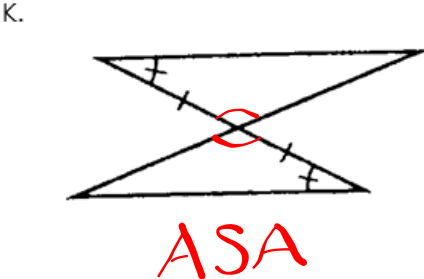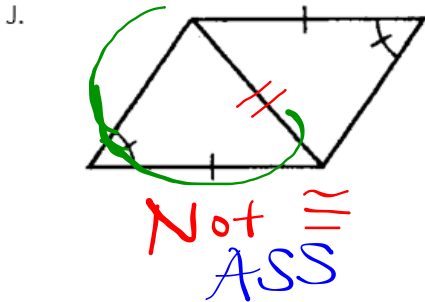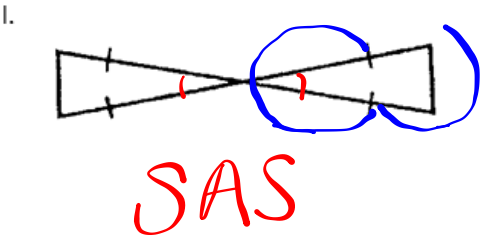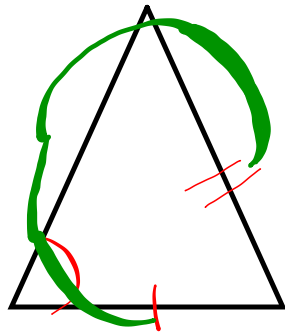
Do Not
skip a
side and
angle

(if you do, turn
and go the other
way)