Name **Mr. Niven**   Period _____ **KEY**

Triangle Congruence

I. Name the congruent triangles.

1. △OGD ≅ △ **PRC**
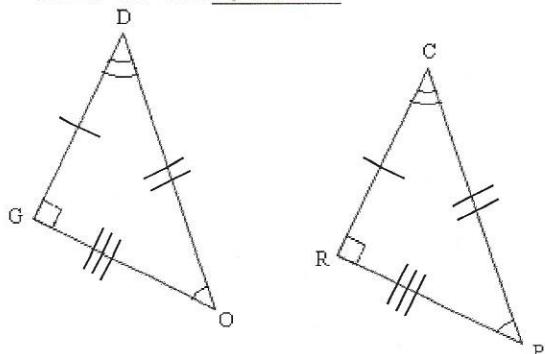
2. △RAC ≅ △ **OEG**
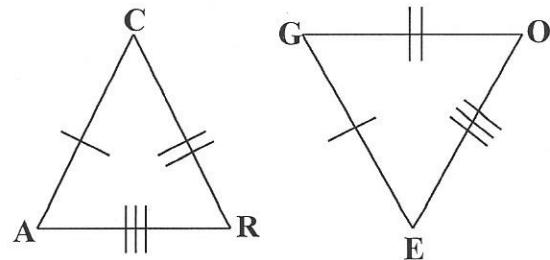
3. △LIN ≅ △ **EAR**
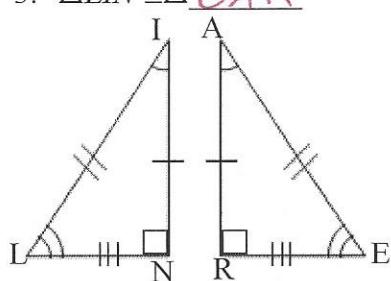
4. △FOX ≅ △ **BXO**
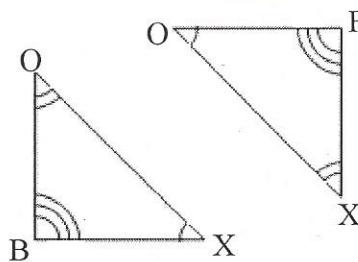
II. Name the congruent triangle and the congruent parts..

7.
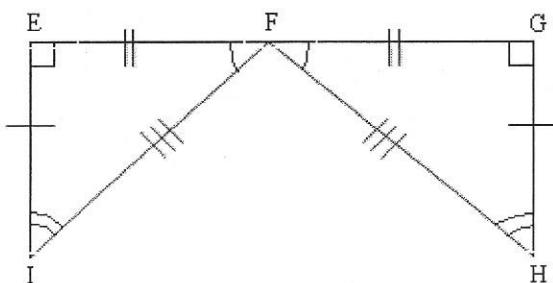
△FGH ≅ △ **FEI**

∡EFI ≅ ∡ **GFH** $\overline{FG}$ ≅ **$\overline{FE}$**

∡G ≅ ∡ **E** $\overline{GH}$ ≅ **$\overline{EI}$**

∡H ≅ ∡ **I** $\overline{FH}$ ≅ **$\overline{FI}$**

Use the congruency statement to fill in the corresponding congruent parts.

8. △EFI ≅ △HGI   ∡E ≅ ∡ **H** $\overline{FE}$ ≅ **$\overline{GH}$**   ∡EFI ≅ ∡ **HGI**

$\overline{FI}$ ≅ **$\overline{GI}$**   ∡FIE ≅ ∡ **GIH** $\overline{IE}$ ≅ **$\overline{IH}$**

9. $\triangle PQR \cong \triangle MNR$. Find x.

$x = 55$

10. $\triangle ABC \cong \triangle ADC$. Find y.

$y = 7$
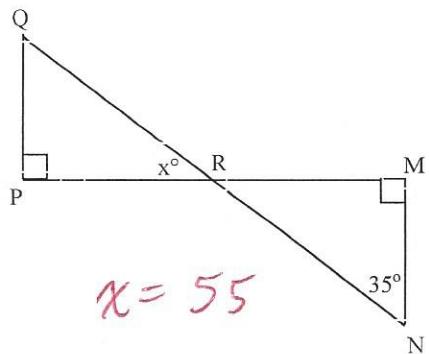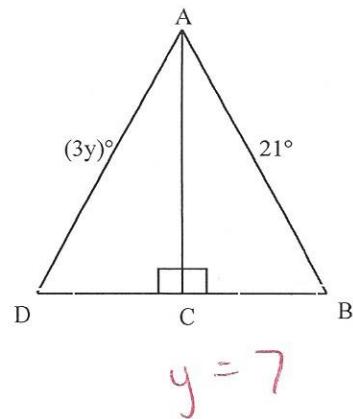
Third Angles Theorem (add to Theorems, Postulates and Definitions Card) –

Proving Triangles Congruent

Given: $\angle P$ and $\angle M$ are right angles.
R is the midpoint of $\overline{PM}$.
$\overline{PQ} \cong \overline{MN}, \overline{QR} \cong \overline{NR}$
Prove: $\triangle PQR \cong \triangle MNR$
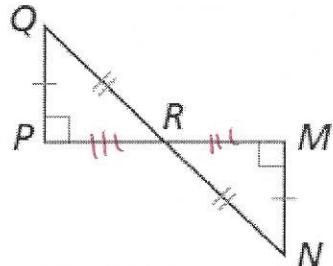
① $\overline{PQ} \cong \overline{MN}, \overline{QR} \cong \overline{NR}$
  R is the midpoint of $\overline{PM}$

② $\overline{PR} \cong \overline{MR}$

③ $\triangle PQR \cong \triangle MNR$

① Given

② Def. of Midpoint

③ SSS

Triangle Congruence Worksheet #1

For each pair of triangles, tell which postulates, **if any**, make the triangles congruent.

12. △ABC ≅ △EFD   *Yes, by SSS*
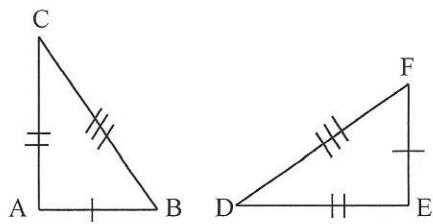
13. △ABC ≅ △CDA   *Yes, by SSS*
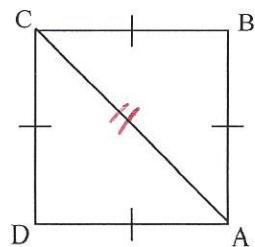
14. △ABC ≅ △EFD   *Yes, by SAS*
    △ABC ≅ △EDF
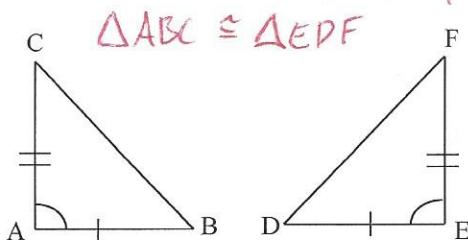
15. △ADC ≅ △BDC   *Yes, by HL*
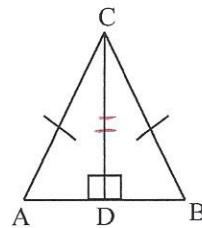
21. △MAD ≅ △MBC   *Not Enough Information*
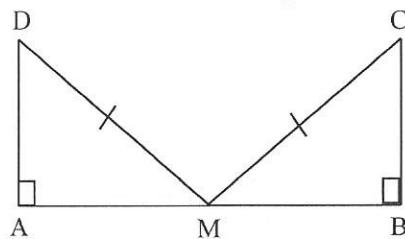
△ABE ≅ △CDE   *Yes, by SAS*
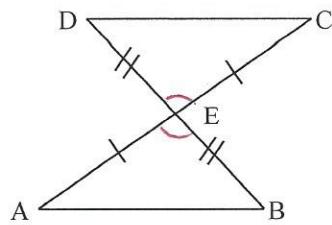
23. △ACB ≅ △ADB   *Yes, by SAS*
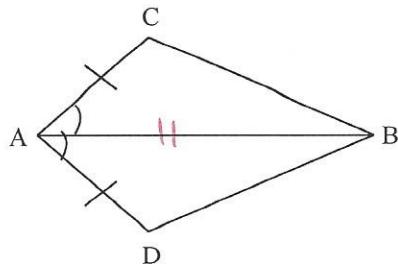
23. △MNP ≅ △MQP   *Yes, SSS*
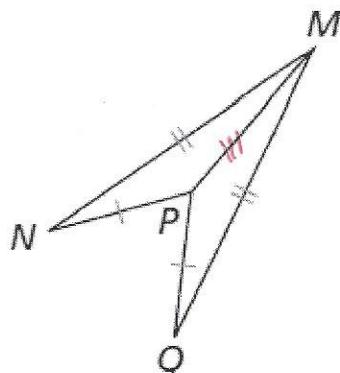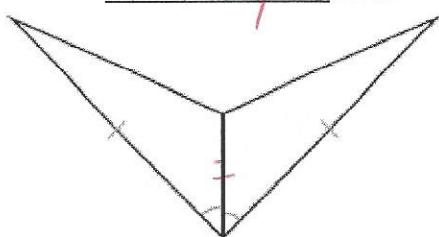
23.   *Yes, by SAS*

Triangle Congruence Worksheet #2

I. For each pair of triangles, tell which postulate, if any, can be used to prove the triangles congruent.
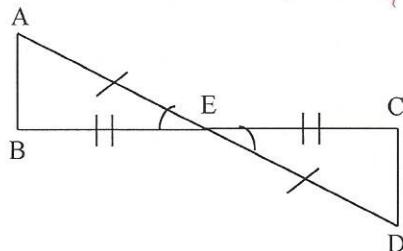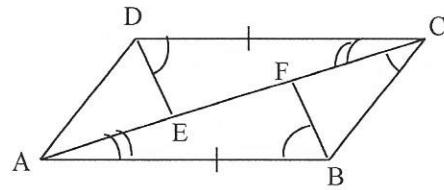
1. ΔAEB ≅ ΔDEC   *Yes, by SAS*

2. ΔCDE ≅ ΔABF   *Yes, by ASA*

3. ΔDEA ≅ ΔBEC   *Yes, by HL*

4. ΔAGE ≅ ΔCDF   *Yes, by SSS*

5. ΔRTS ≅ ΔCBA   *Yes, by AAS*

6. ΔABC ≅ ΔADC   *Yes, by AAS*
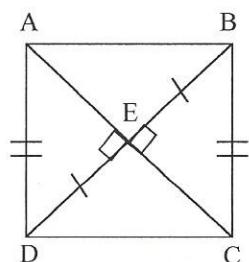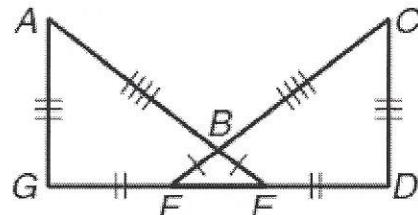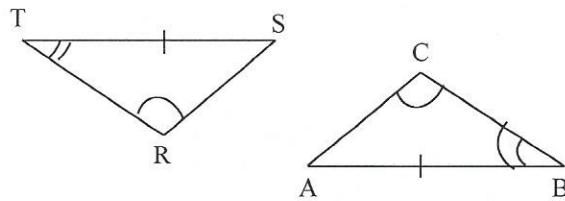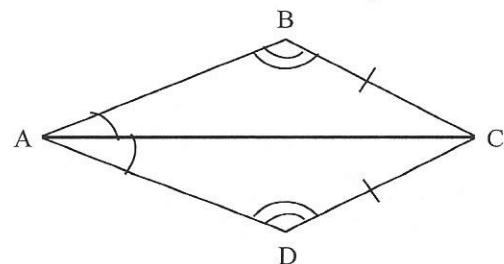
7. ΔBAP ≅ ΔBCP   *Yes, by SAS*
Given: BD bisects ∠ABC
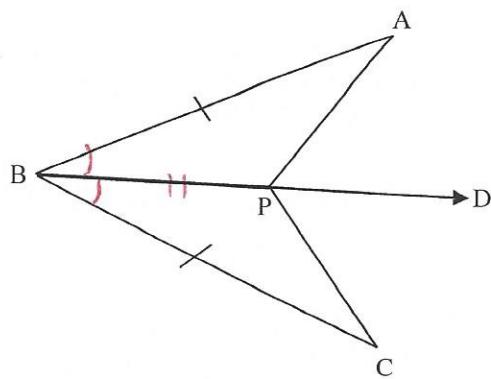
8. ΔSAT ≅ ΔSAR   *Yes, by HL*
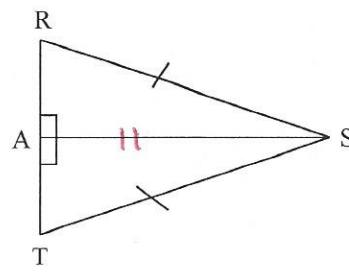
II. For each pair of triangles, tell: (a) Are they congruent (b) Write the triangle congruency statement. (c) Give the postulate that makes them congruent.

1.

a. __Yes__

b. Δ__DCE__ ≅ Δ__BAE__

c. __ASA__

2.
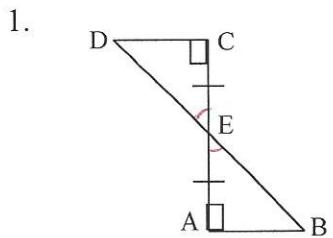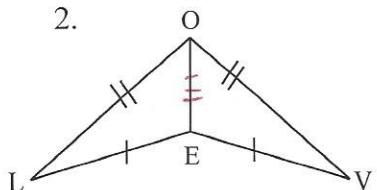
a. __Yes__

b. Δ__LOE__ ≅ Δ__VOE__

c. __SSS__

3. Given: T is the midpoint of $\overline{WR}$

a. __No__

b. Δ____ ≅ Δ____
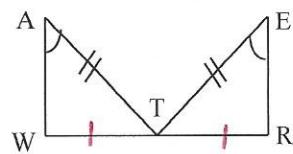
c. __SSA doesn't ensure ≅__

4.
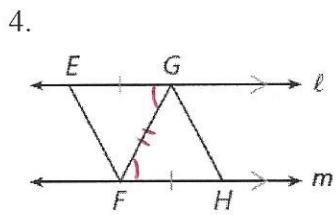
a. __Yes__

b. Δ__EGF__ ≅ Δ__HFG__

c. __SAS__

5. Given: $\overrightarrow{IH}$ Bisects ∠WIS
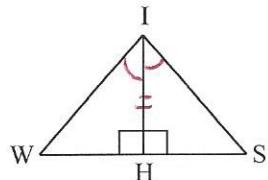
a. __Yes__

b. Δ__WIH__ ≅ Δ__SIH__

c. __ASA__

6.

a. __Yes__

b. Δ__LUE__ ≅ Δ__EGL__

c. __ASA__

7.

a. __Yes__

b. Δ__RUT__ ≅ Δ__TSR__

c. __ASA__

8.

a. __Yes__

b. Δ__YVW__ ≅ Δ__VYZ__

c. __ASA__

9.

a. __No__

b. Δ____ ≅ Δ____
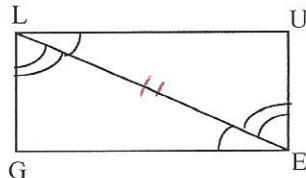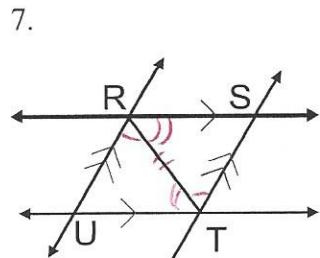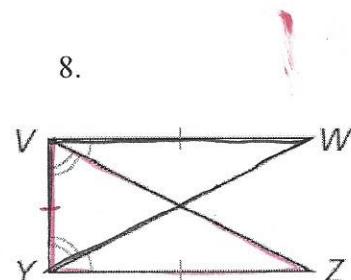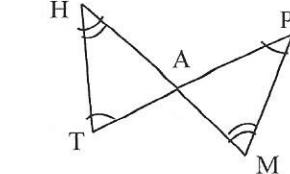
c. __AAA doesn't ensure ≅.__

10. Given: I is the midpoint of $\overline{ME}$ and $\overline{SL}$

a. ___Yes___

b. Δ___MIS___ ≅ Δ___EIL___

c. ___SAS___

11.

a. ___Yes___

b. Δ___WVX___ ≅ Δ___XYW___

c. ___HL___

12.

a. ___No___

b. Δ_____ ≅ Δ_____
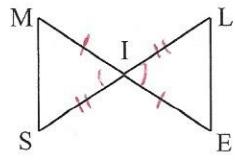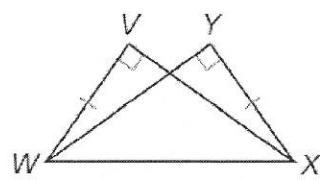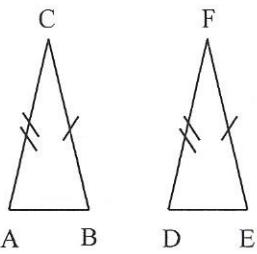
c. ___Not enough information need 3 pieces of info.___

III. Using the given postulate, tell which parts of the pair of triangles should be shown congruent.

1. SAS
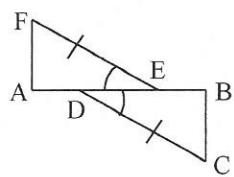
___$\overline{AE}$___ ≅ ___$\overline{BD}$___

2. ASA
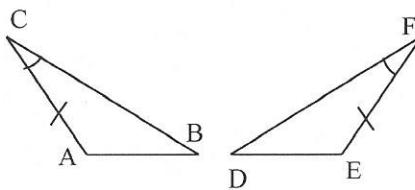
___∡A___ ≅ ___∡E___

3. SSS
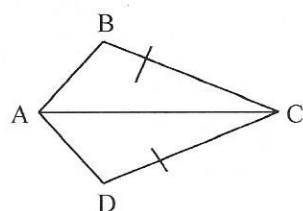
___$\overline{AB}$___ ≅ ___$\overline{AD}$___

4. AAS
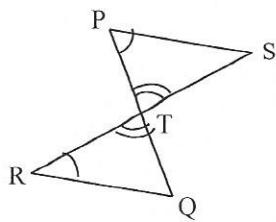
___$\overline{TQ}$___ ≅ ___$\overline{TS}$___

___$\overline{PS}$___ ≅ ___$\overline{RQ}$___

5. HL
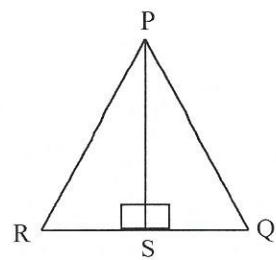
___$\overline{RP}$___ ≅ ___$\overline{QP}$___

6. ASA
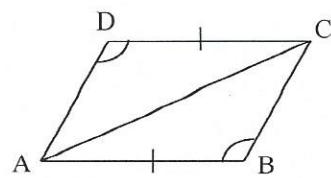
___∡DCA___ ≅ ___∡BAC___

Triangle Proofs Worksheet

For each problem below, write a two-column proof on a separate piece of paper.

I. Proving Triangles Congruent:

1. Use AAS to prove the triangles congruent.
  Given: $\overline{AD} \parallel \overline{BC}, \overline{AD} \cong \overline{CB}$
  Prove: $\triangle AED \cong \triangle CEB$

2. Given: $\overline{KM} \perp \overline{JL}, \overline{JM} \cong \overline{LM}, \angle JMK \cong \angle LMK$
  Prove: $\triangle JKM \cong \triangle LKM$

Two ways to prove

3. Given: $\overline{AB} \cong \overline{DE}, \angle C \cong \angle F$
  Prove: $\triangle ABC \cong \triangle DEE$

4. Given: $\overline{JK} \cong \overline{ML}, \angle JKL \cong \angle MLK$
  Prove: $\triangle JKL \cong \triangle MLK$

5. Given: B is the midpoint of $\overline{DC}. \overline{AB} \perp \overline{DC}$
  Prove: $\triangle ABD \cong \triangle ABC$
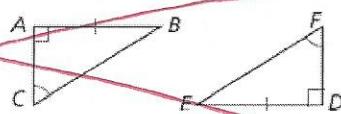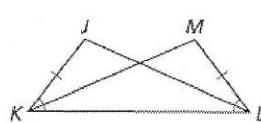
6. Use AAS to prove the triangles congruent.
  Given: $\angle R$ and $\angle P$ are right angles.
     $\overline{QR} \parallel \overline{SP}$
  Prove: $\triangle QPS \cong \triangle SRQ$
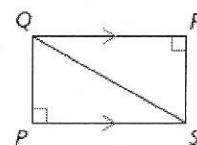
II. Using CPCTC

7. Given: G is the midpoint of $\overline{FH}$.
     $\overline{EF} \cong \overline{EH}$
  Prove: $\angle 1 \cong \angle 2$

8. Given: $\overline{LM}$ bisects $\angle JLK. \overline{JL} \cong \overline{KL}$
  Prove: M is the midpoint of $\overline{JK}$.

9. Given: $\overline{AC} \cong \overline{AD}, \overline{CB} \cong \overline{DB}$
  Prove: $\overline{AB}$ bisects $\angle CAD$.
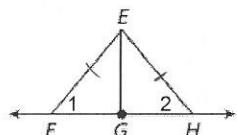
10. Given: $\overline{WX} \cong \overline{XY} \cong \overline{YZ} \cong \overline{ZW}$
  Prove: $\angle W \cong \angle Y$
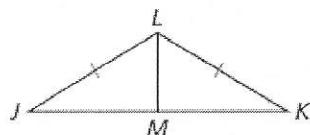
11. Given: M is the midpoint of
     $\overline{PQ}$ and $\overline{RS}$.
  Prove: $\overline{QR} \cong \overline{PS}$
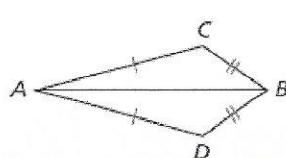
Triangle Proof Worksheet

(1)

Statements	Reasons
① $\overline{AD} \cong \overline{CB}$ $\overline{AD} \parallel \overline{CB}$	① Given
② ∢ADE ≅ ∢CBE	② If lines ∥, then Alt. Int. ∢s ≅.
③ ∢AED ≅ ∢CEB	③ Def. of Vertical Angles
④ △AED ≅ △CEB	④ AAS

**(2)**

Statements	Reasons
① $\overline{JM} \cong \overline{LM}$ ∢JMK ≅ ∢LMK	① Given
② $\overline{KM} \cong \overline{KM}$	② Reflexive Prop. of Congruence
③ △JKM ≅ △LKM	③ SAS

OR!!!

Statements	Reasons
① $\overline{JM} \cong \overline{LM}$ & $\overline{KM} \perp \overline{JL}$	① Given
② ∢JKM is a right angle ∢LKM is a right angle	② Def. of Perpendicular Lines
③ △JKM is a right △ △LKM is a right △	③ Def. of Right triangle.
④ $\overline{KM} \cong \overline{KM}$	④ Reflexive Prop. of Congruence
⑤ △JKM ≅ △LKM	⑤ HL

(4)

Statements	Reasons
① $\overline{JK} \cong \overline{ML}$, ∢JKL ≅ ∢MLK	① Given
② $\overline{KL} \cong \overline{KL}$	② Reflexive Prop. of Congruence
③ △JKL ≅ △MLK	③ SAS

(5)

Statements	Reasons
① B is the midpoint of $\overline{DC}$	① Given
② $\overline{DB} \cong \overline{CB}$	② Def. of Midpoint
③ $\overline{AB} \cong \overline{AB}$	③ Reflexive Prop. of Congruence
④ $\overline{AB} \perp \overline{DC}$	④ Given
⑤ ∢DBA is a right angle ∢CBA is a right angle	⑤ Def. of Perpendicular Lines.
⑥ ∢DBA ≅ ∢CBA	⑥ Def. of Right Angle. All Rt. ∢s ≅.
⑦ △ABD ≅ △ABC	⑦ SAS

(6)

Statements	Reasons
① ∠R and ∠P are Right Angles	① Given
② ∠R ≅ ∠P	② Def. of Right Angles. All Rt. ∠s ≅
③ $\overline{QR} \parallel \overline{SP}$	③ Given
④ ∠PSQ ≅ ∠RQS	④ If lines ∥, then Alt. Int. ∠s ≅.
⑤ $\overline{QS} ≅ \overline{QS}$	⑤ Reflexive Prop. of congruence.
⑥ △QPS ≅ △SRQ	⑥ AAS

(7)

Statements	Reasons
① $\overline{EF} ≅ \overline{EH}$ G is Midpoint $\overline{FH}$	① Given
② $\overline{FG} ≅ \overline{HG}$	② Def. of Midpoint
③ $\overline{EG} ≅ \overline{EG}$	③ Reflexive Prop. of congruence
④ △FGE ≅ △HGE	④ SSS
⑤ ∠1 ≅ ∠2	⑤ CPCTC

(8)

Statements	Reasons
① $\overline{JL} ≅ \overline{KL}$ & $\overline{LM}$ bisects ∠JKL	① Given
② ∠JLM ≅ ∠KLM	② Def. of Angle Bisector
③ $\overline{LM} ≅ \overline{LM}$	③ Reflexive Prop. of congruence
④ △JLM ≅ KLM	④ SAS
⑤ $\overline{JM} ≅ \overline{KM}$	⑤ CPCTC
⑥ M is midpoint of $\overline{JK}$	⑥ Def. of Midpoint

(9)

Statements	Reasons
① $\overline{AC} ≅ \overline{AD}$, $\overline{CB} ≅ \overline{DB}$	① Given
② $\overline{AB} ≅ \overline{AB}$	② Reflexive Prop. of Congruence
③ △ABC ≅ △ABD	③ SSS
④ ∠CAB ≅ ∠DAB	④ CPCTC
⑤ $\overline{AB}$ bisects ∠CAD	⑤ Def. of ∠ Bisector

10

Statements	Reasons
① $\overline{WX} \cong \overline{XY} \cong \overline{YZ} \cong \overline{ZW}$	① Given
② $\overline{ZX} \cong \overline{ZX}$	② Reflexive Prop. of congruence
③ $\triangle ZWX \cong \triangle XYZ$	③ SSS
④ $\angle W \cong \angle Y$	④ CPCTC

11

Statements	Reasons
① M is midpoint of $\overline{PQ}$ and $\overline{RS}$	① Given
② $\overline{PM} \cong \overline{QM}$	② Def. of Midpoint
$\overline{RM} \cong \overline{SM}$	
③ $\angle SMP \cong \angle RMQ$	③ Def. of Vertical Angles.
④ $\triangle SMP \cong \triangle RMQ$	④ SAS
⑤ $\overline{QR} \cong \overline{PS}$	⑤ CPCTC

Review: Triangles and Triangle Congruence

You will need a separate piece of paper to show all your work. This review is *not* comprehensive; always be sure to go back through your old homework and quizzes.

◎ *I can write a congruency statement representing two congruent polygons*
1. Write a congruency statement for the two triangles at right.

$$\triangle CAR \cong \triangle GEO$$
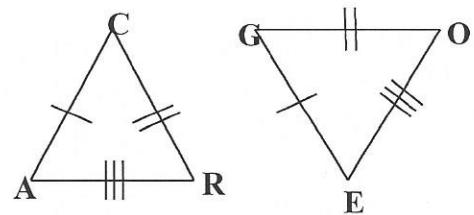
◎ *I can identify congruent parts of a polygon, given a congruency statement*
2. List ALL of the congruent parts if $\triangle EFG \cong \triangle HGF$

$\angle E \cong \angle H$ $\angle G \cong \angle F$ $\overline{FG} \cong \overline{GF}$

$\angle F \cong \angle G$ $\overline{EF} \cong \overline{HG}$ $\overline{EG} \cong \overline{HF}$

◎ *I can use algebra to find the side lengths and angle measures of congruent polygons*
3. $\triangle WXY \cong \triangle ZYX$. Find p.

$$p = 1$$
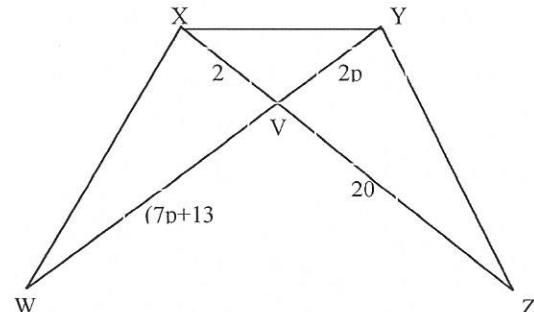
4. $\triangle ADC \cong \triangle CBA$. Find x.

$$x = -1$$
$$x = -7$$
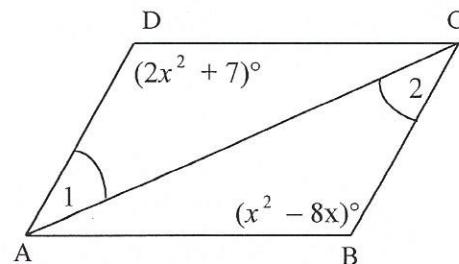
◎ *I can name the five ways to prove triangles are congruent*
5. Name the 5 ways to prove triangles congruent.

SSS, SAS, AAS, ASA, & HL

◎ *I can prove triangles are congruent*
For each pair of triangles, tell: (a) Are they congruent (b) Write the triangle congruency statement. (c) Give the postulate that makes them congruent.

6.
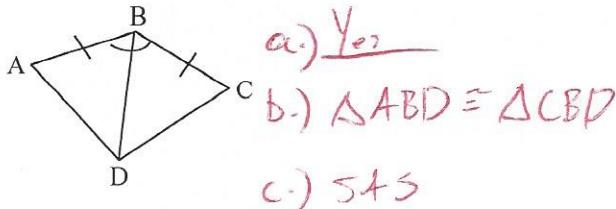
a.) Yes

b.) $\triangle ABD \cong \triangle CBD$

c.) SAS

8. Given: I is the midpoint of $\overline{ME}$ and $\overline{SL}$
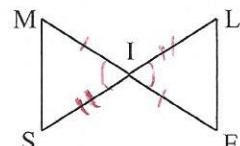
Yes

$\triangle MIS \cong \triangle EIL$

SAS

7.
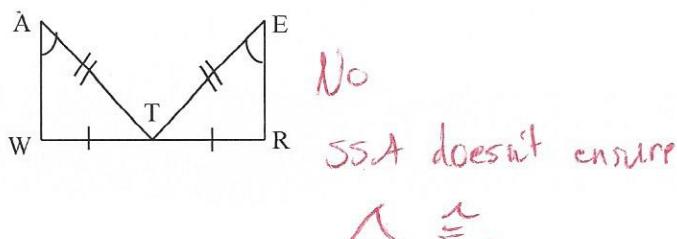
No

SSA doesn't ensure

$\triangle \cong$.

◎ *I can mark pieces of a triangle congruent given how they are to be proved congruent*

9. What information is missing to use HL?

$$\overline{RS} \cong \overline{QS}$$
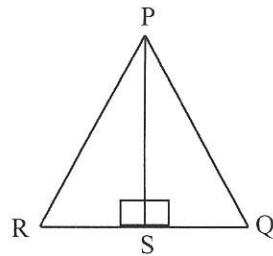
10. What information is missing to use SAS?

$$\angle ABD \cong \angle CDB$$
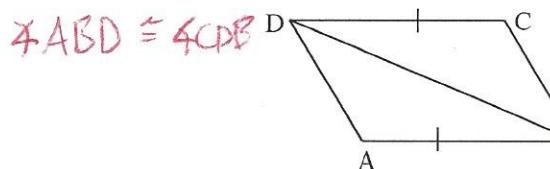
IV. For which value(s) of x are the triangles congruent?

3. x = __5 + 2__

m ∠3 = x^2

m ∠4 = 7x - 10

4. x = __x = 4__

4x + 8   7x - 4

5. x = __2 + 4__

$x^2 + 3x$

9x - 8

$x^2 + 2x$ $x^2 + 24$

x = 12
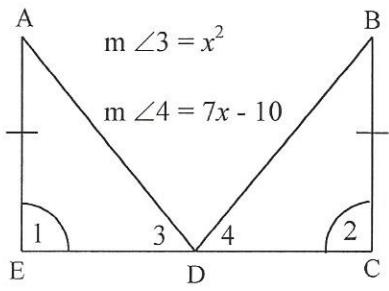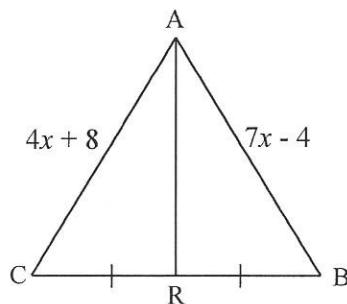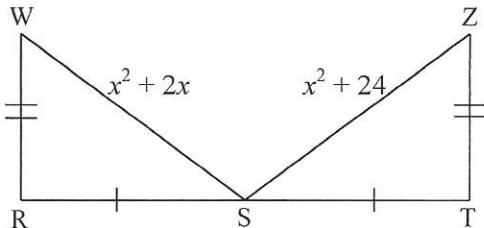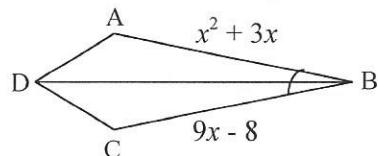
◎ *I can write a two-column proof over congruent triangles*

11.
Given: $\overline{JK} \cong \overline{ML}$, $\angle JKL \cong \angle MLK$
Prove: $\triangle JKL \cong \triangle MLK$
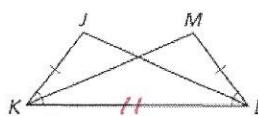
12. Complete and review ALL proofs on the proofs worksheet.

Statements	Reasons
① $\overline{JK} \cong \overline{ML}$, $\angle JKL \cong \angle MLK$	① Given
② $\overline{KL} \cong \overline{KL}$	② Reflexive Prop. of congruence
③ $\triangle JKL \cong \triangle MLK$	③ SAS