

GEOMETRY UNIT 6 – CONGRUENT TRIANGLES**Vocabulary Terms:**

| | | |
|-------------------------------|-------------------|-----|
| Congruent Corresponding Parts | HL | SSS |
| Congruency statement | Non-included side | SAS |
| Included angle | Hypotenuse | ASA |
| Included side | Leg | AAS |

| | | | |
|---------------------|----------------------|--|----------------------------|
| | | | 11/2 Congruent Polygons |
| 11/5 SSS and SAS | 11/6 ASA, AAS, HL | 11/7-8 Congruent Triangles and Logic | 11/9 CPCTC |
| 11/12 Review | 11/13 Test | | |

Friday, 11/2

| | |
|---|------------|
| Chapter 4 Section 3: Congruent Triangles | |
| I can match the corresponding parts of congruent figures given a picture or a congruency statement. | |
| I can prove polygons congruent using the definition of congruent polygons. | |
| ASSIGNMENT: Pg. 234 (#2-11, 13-16, 19, 21-22, 28-31) | Completed: |

Monday, 11/5

| | |
|--|------------|
| Chapter 4 Section 4: Triangle Congruence: SSS and SAS | |
| I can determine if 2 triangles are congruent using SSS or SAS. | |
| ASSIGNMENT: Triangle Congruence WST - #2, 4, 8, 9, 13, 15, 16, 19 | Completed: |

Tuesday, 11/6

| | |
|---|------------|
| Chapter 4 Section 5: Triangle Congruence: ASA, AAS, and HL | |
| I can determine if 2 triangles are congruent using ASA, AAS, or HL. | |
| ASSIGNMENT: Triangle Congruence WST - Finish | Completed: |

Wednesday or Thursday, 11/7-8

| | |
|--|------------|
| Chapter 4 Section 4 and 5: Triangle Congruence: SSS and SAS AND ASA, AAS, and HL | |
| I can determine if 2 triangles are congruent using SSS, SAS, ASA, AAS, or HL. | |
| I can determine the missing piece of information needed to prove triangles congruent | |
| I can complete a fill-in-the-blank proof. | |
| I can use triangle congruence and logic to solve problems. | |
| ASSIGNMENT: Triangle Congruence and Logic Worksheet | Completed: |

Friday, 11/9

| | |
|---|------------|
| Chapter 4 Section 6: CPCTC | |
| I can use CPCTC to solve different types of problems. | |
| I can use CPCTC in geometric proofs | |
| ASSIGNMENT: CPCTC Worksheet | Completed: |

Monday, 11/12

Review Day

ASSIGNMENT: Review for Test

Completed:

Tuesday, 11/13

Test Day

Unit 6 Test: Congruent Triangles

Grade:

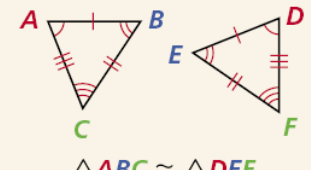
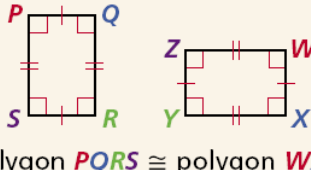
If you miss the review day, you are still expected to take the test on the test day.

For more help BEFORE the test:

1. Use the indicated chapters in your book
2. Use the book online (it has videos and a homework help section)
3. Use Google to find more resources
4. Come to tutoring (with assignment)

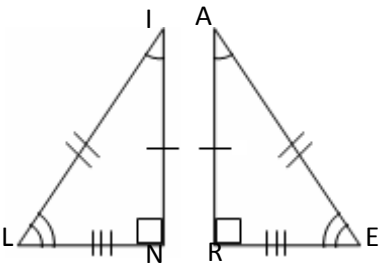
CONGRUENT Polygons Examples

Properties of Congruent Polygons

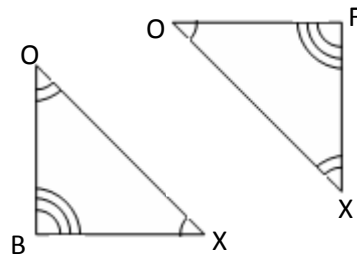
| DIAGRAM | CORRESPONDING ANGLES | CORRESPONDING SIDES |
|--|--|--|
|  <p style="text-align: center;">$\triangle ABC \cong \triangle DEF$</p> | $\angle A \cong \angle D$ $\angle B \cong \angle E$ $\angle C \cong \angle F$ | $\overline{AB} \cong \overline{DE}$ $\overline{BC} \cong \overline{EF}$ $\overline{AC} \cong \overline{DF}$ |
|  <p style="text-align: center;">polygon $PQRS \cong$ polygon $WXYZ$</p> | $\angle P \cong \angle W$ $\angle Q \cong \angle X$ $\angle R \cong \angle Y$ $\angle S \cong \angle Z$ | $\overline{PQ} \cong \overline{WX}$ $\overline{QR} \cong \overline{XY}$ $\overline{RS} \cong \overline{YZ}$ $\overline{PS} \cong \overline{WZ}$ |

I. Name the congruent triangles.

1. $\triangle LIN \cong \triangle$ _____

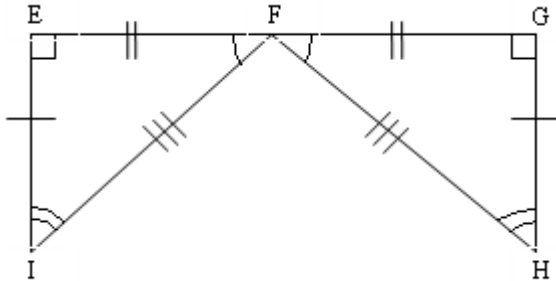


2. $\triangle FOX \cong \triangle$ _____



II. Name the congruent triangle and the congruent parts..

3.



$\triangle FGH \cong \triangle$ _____

$\angle EFI \cong \angle$ _____

$\overline{FG} \cong$ _____

$\angle G \cong \angle$ _____

$\overline{GH} \cong$ _____

$\angle H \cong \angle$ _____

$\overline{FH} \cong$ _____

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

4. $\triangle EFI \cong \triangle HGI$ $\angle E \cong \angle$ _____ $\overline{FE} \cong$ _____

$\angle EFI \cong \angle$ _____ $\overline{FI} \cong$ _____

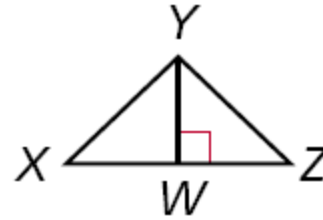
$\angle FIE \cong \angle$ _____ $\overline{IE} \cong$ _____

Example 3: Proving Triangles Congruent

Given: $\angle YWX$ and $\angle YWZ$ are right angles.

YW bisects $\angle XYZ$. W is the midpoint of XZ . $XY \cong YZ$.

Prove: $\triangle XYW \cong \triangle ZYW$



| Statements | Reasons |
|---|------------------------------------|
| 1. $\angle YWX$ and $\angle YWZ$ are rt. \angle s. | 1. Given |
| 2. | 2. Rt. $\angle \cong$ Thm. |
| 3. YW bisects $\angle XYZ$ | 3. Given |
| 4. $\angle XYW \cong \angle ZYW$ | 4. |
| 5. W is mdpt. of \overline{XZ} | 5. Given |
| 6. $\overline{XW} \cong \overline{ZW}$ | 6. |
| 7. $\overline{YW} \cong \overline{YW}$ | 7. Reflex. Prop. of \cong |
| 8. $\angle X \cong \angle Z$ | 8. Third \angle s Thm. |
| 9. $\overline{XY} \cong \overline{YZ}$ | 9. Given |
| 10. | 10. |

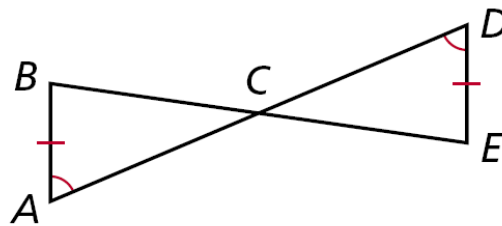
Check It Out! Example 3

Given: AD bisects BE .

BE bisects AD .

$AB \cong DE$, $\angle A \cong \angle D$

Prove: $\triangle ABC \cong \triangle DEC$



| Statements | Reasons |
|--|---------------------------------|
| 1. $\angle A \cong \angle D$ | 1. |
| 2. $\angle BCA \cong \angle DCE$ | 2. |
| 3. | 3. Third \angle s Thm. |
| 4. $\overline{AB} \cong \overline{DE}$ | 4. Given |
| 5. \overline{AD} bisects \overline{BE} , \overline{BE} bisects \overline{AD} | 5. Given |
| 6. | 6. Def. of bisector |
| 7. $\triangle ABC \cong \triangle DEC$ | 7. |

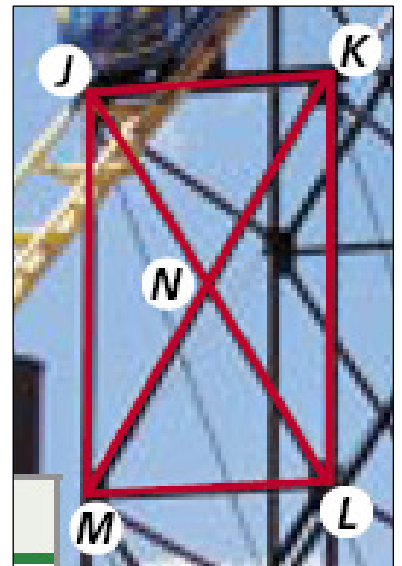
Check It Out! Example 4

Use the diagram to prove the following.

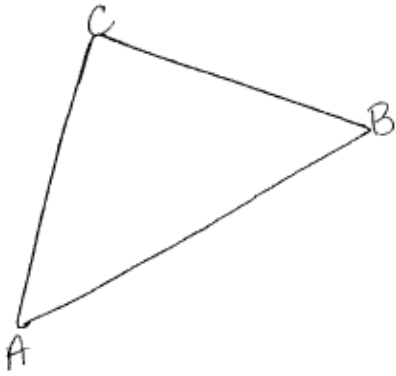
Given: MK bisects JL . JL bisects MK . $JK \cong ML$. $JK \parallel ML$.

Prove: $\triangle JKN \cong \triangle LMN$

| Statements | Reasons |
|--|--------------------------|
| 1. $\overline{JK} \cong \overline{ML}$ | 1. Given |
| 2. $\overline{JK} \parallel \overline{ML}$ | 2. Given |
| 3. $\angle JKN \cong \angle NML$ | 3. |
| 4. \overline{JL} and \overline{MK} bisect each other. | 4. Given |
| 5. $\overline{JN} \cong \overline{LN}$, $\overline{MN} \cong \overline{KN}$ | 5. Def. of bisector |
| 6. $\angle KNJ \cong \angle MNL$ | 6. |
| 7. | 7. Third \angle s Thm. |
| 8. | 8. |

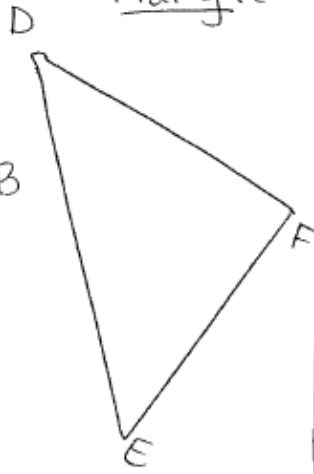


SSS
side-side-side

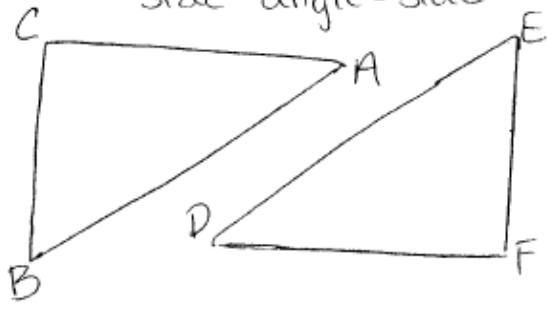


≅
≅
≅

Triangle



Congruence SAS
side-angle-side



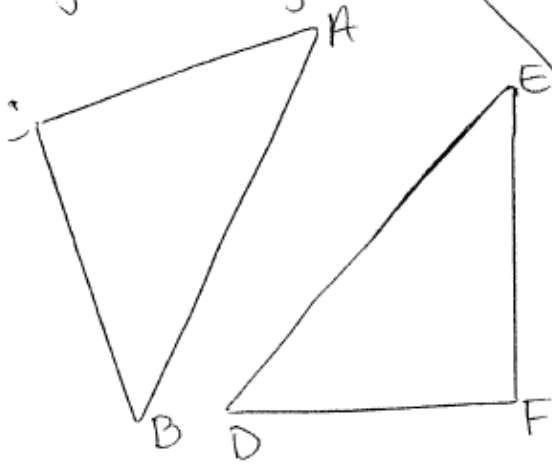
≅
≅
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HL
hypotenuse-leg



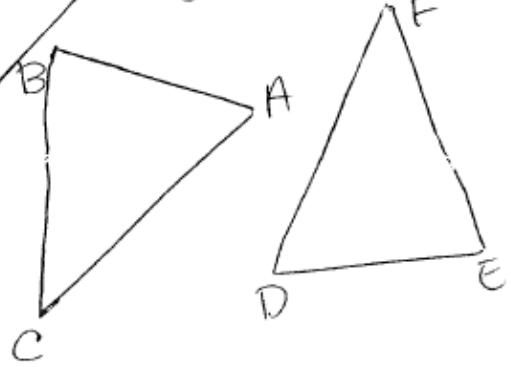
≅
≅
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ASA
angle-side-angle



≅
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AAS
angle-angle-side



≅
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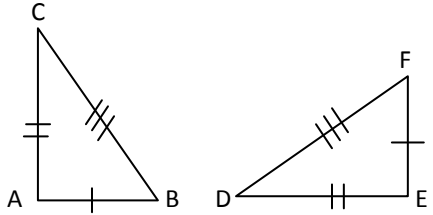
Name _____ Period _____

Triangle Congruence

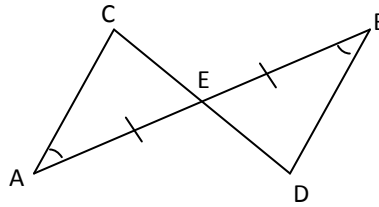
1. List the five ways to prove that triangles are congruent.

For each pair of triangles, tell which of the above postulates make the triangles congruent.

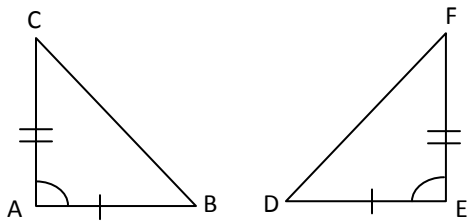
2. $\triangle ABC \cong \triangle EFD$ _____



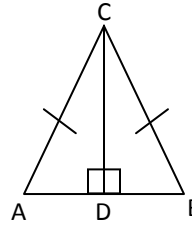
3. $\triangle AEC \cong \triangle BED$ _____



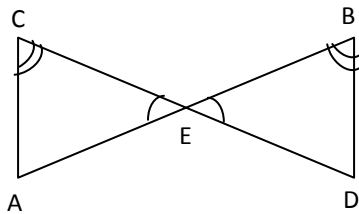
4. $\triangle ABC \cong \triangle EFD$ _____



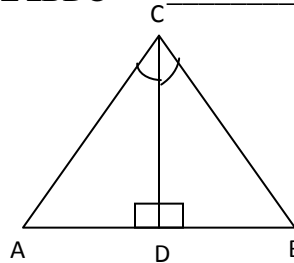
5. $\triangle ADC \cong \triangle BDC$ _____



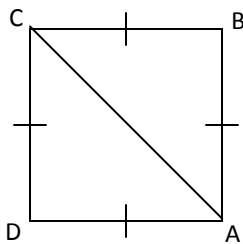
6. $\triangle ACE \cong \triangle DBE$ _____



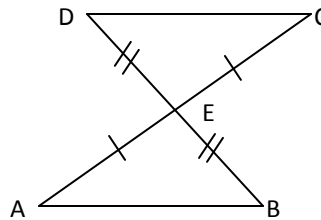
7. $\triangle ADC \cong \triangle BDC$ _____



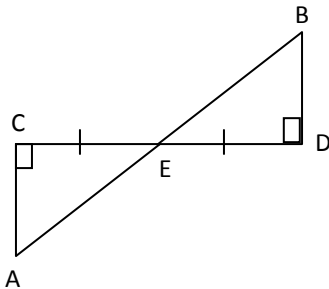
8. $\triangle ABC \cong \triangle CDA$ _____



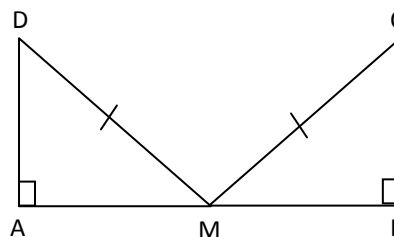
9. $\triangle ABE \cong \triangle CDE$ _____



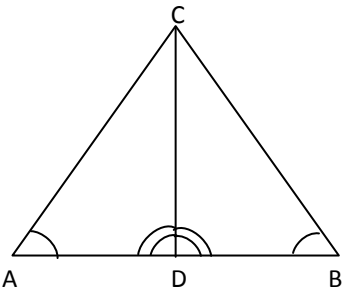
10. $\triangle CAE \cong \triangle DBE$ _____



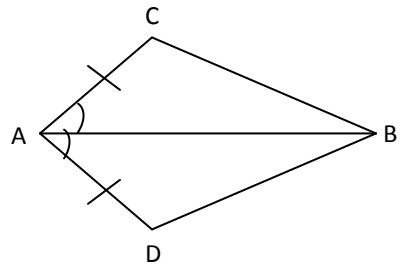
11. $\triangle MAD \cong \triangle MBC$ _____



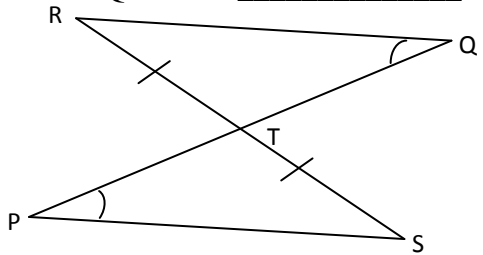
12. $\triangle DCA \cong \triangle DCB$ _____



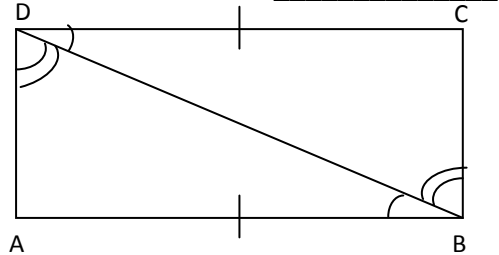
13. $\triangle ACB \cong \triangle ADB$ _____



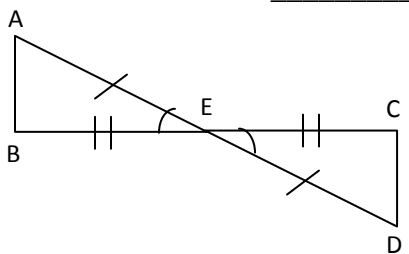
14. $\triangle RTQ \cong \triangle STP$ _____



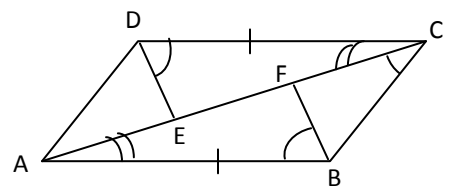
15. $\triangle DBA \cong \triangle BDC$ _____



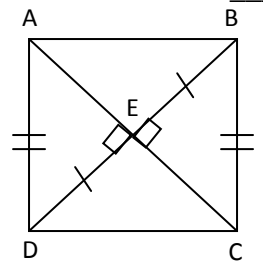
16. $\triangle AEB \cong \triangle DEC$ _____



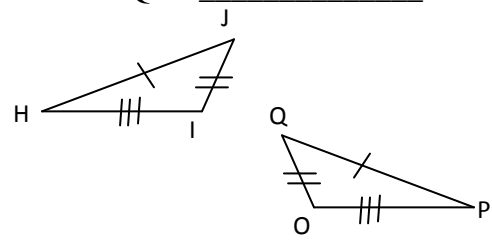
17. $\triangle CDE \cong \triangle ABF$ _____



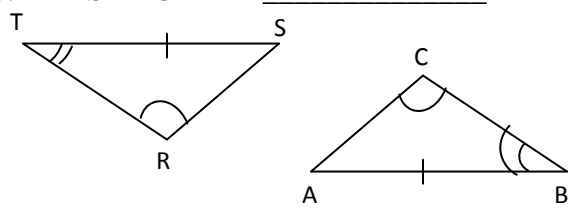
18. $\triangle DEA \cong \triangle BEC$ _____



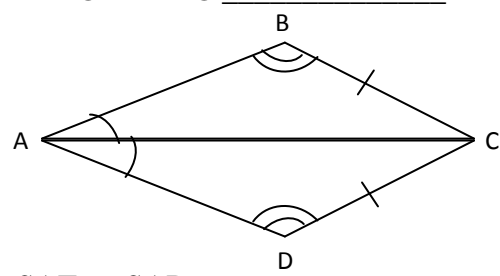
19. $\triangle HIJ \cong \triangle QOP$ _____



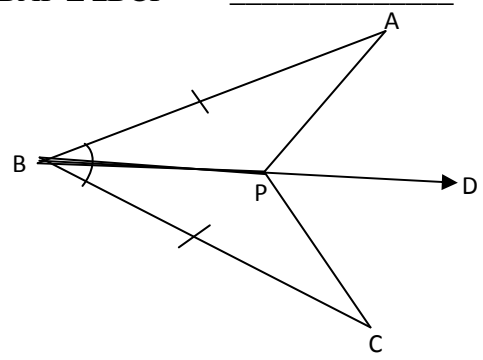
20. $\triangle RTS \cong \triangle CAB$ _____



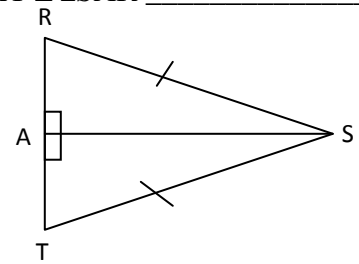
21. $\triangle ABC \cong \triangle ADC$ _____



7. $\triangle BAP \cong \triangle BCP$ _____

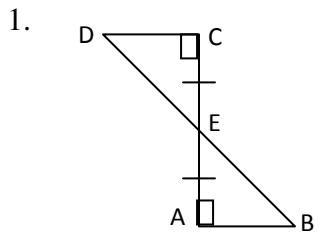


8. $\triangle SAT \cong \triangle SAR$ _____

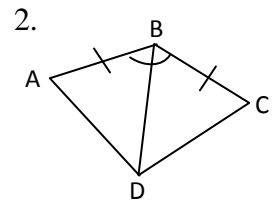


Triangle Congruence and Logic Worksheet

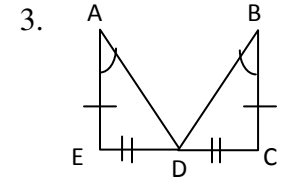
I. For each pair of triangles, tell: (a) Are they congruent (b) Write the triangle congruency statement. (c) Give the postulate that makes them congruent.



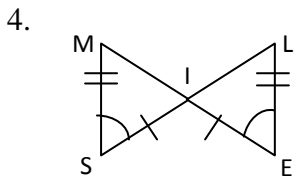
a. _____
 b. Δ _____ \cong Δ _____
 c. _____



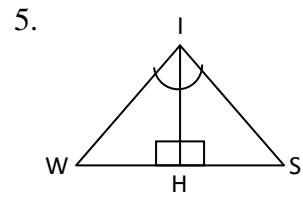
a. _____
 b. Δ _____ \cong Δ _____
 c. _____



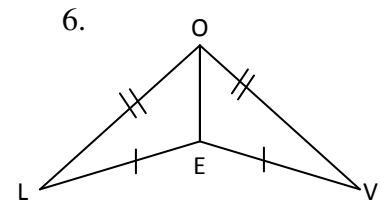
a. _____
 b. Δ _____ \cong Δ _____
 c. _____



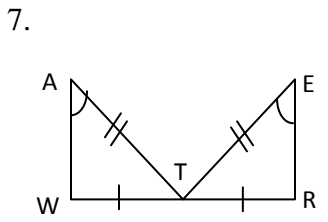
a. _____
 b. Δ _____ \cong Δ _____
 c. _____



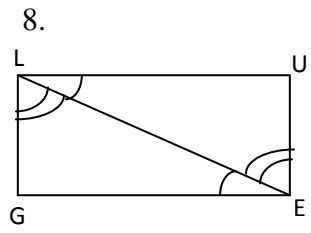
a. _____
 b. Δ _____ \cong Δ _____
 c. _____



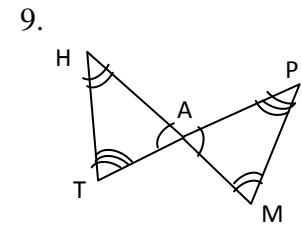
a. _____
 b. Δ _____ \cong Δ _____
 c. _____



a. _____
 b. Δ _____ \cong Δ _____
 c. _____



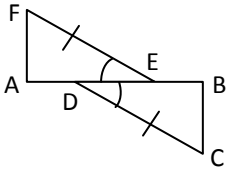
a. _____
 b. Δ _____ \cong Δ _____
 c. _____



a. _____
 b. Δ _____ \cong Δ _____
 c. _____

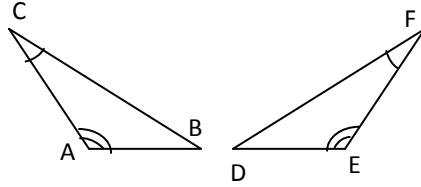
II. Using the given postulate, tell which parts of the pair of triangles should be shown congruent.

10. SAS



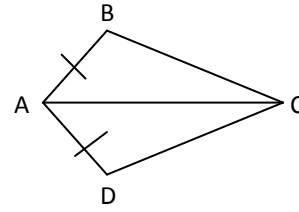
_____ \cong _____

11. ASA



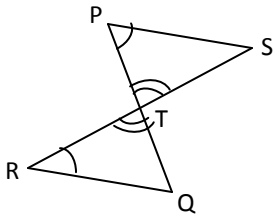
_____ \cong _____

12. SSS



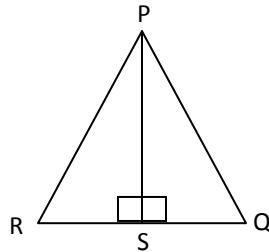
_____ \cong _____

13. AAS



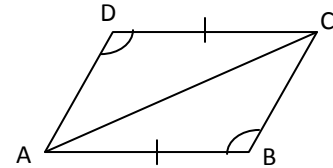
_____ \cong _____

14. HL



_____ \cong _____

15. ASA

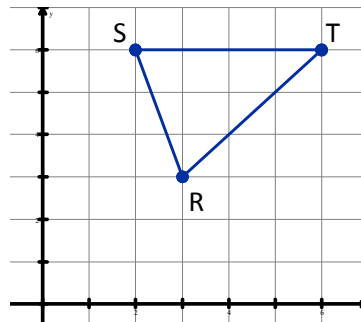


_____ \cong _____

III. Multiple Choice

16. Which set of coordinates represents the vertices of a triangle congruent to ΔRST ? (Hint: Find the lengths of the sides of ΔRST)

- A. (3, 4) (3, 0) (0, 0)
- B. (3, 3) (0, 4) (0, 0)
- C. (3, 1) (3, 3) (4, 6)
- D. (3, 0) (4, 4) (0, 6)

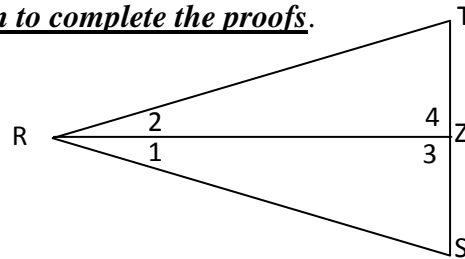


17. Given ΔABC and ΔDEF . Which of the following pairs of corresponding parts would correctly prove the triangles congruent by ASA?

- A. $\angle B \cong \angle E, \angle A \cong \angle D, \overline{AB} \cong \overline{DE}$
- B. $\angle C \cong \angle F, \angle A \cong \angle D, \overline{AB} \cong \overline{DE}$
- C. $\angle B \cong \angle E, \angle C \cong \angle F, \overline{AB} \cong \overline{DE}$
- D. $\angle B \cong \angle E, \angle A \cong \angle D, \overline{AC} \cong \overline{DF}$

For 18 – 19: Fill in the blank with the correct statement or reason to complete the proofs.

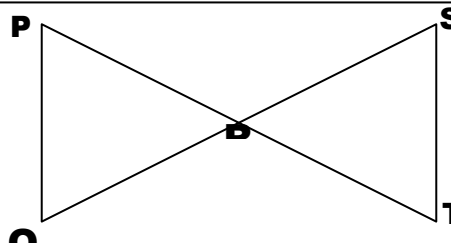
18. GIVEN: \overline{RZ} bisects \overline{TS} ; $\angle 3 \cong \angle 4$
 PROVE: $\triangle RZS \cong \triangle RZT$



| STATEMENTS | REASONS |
|--|----------------------------------|
| 1. \overline{RZ} bisects \overline{TS} | |
| 2. | Definition of a segment bisector |
| 3. | Given |
| 4. $\overline{RZ} \cong \overline{RZ}$ | |
| 5. $\triangle RZS \cong \triangle RZT$ | |

- A. Reflexive Property B. Given C. $\angle 3 \cong \angle 4$
 D. $\overline{TZ} \cong \overline{ZS}$ E. SAS

19. GIVEN: $\angle Q \cong \angle S$;
 R is the midpoint of \overline{QS} .
 PROVE: $\triangle PRQ \cong \triangle TRS$



| STATEMENTS | REASONS |
|--|------------------------|
| 1. $\angle Q \cong \angle S$ | |
| 2. | Given |
| 3. $\overline{QR} \cong \overline{RS}$ | |
| 4. | Vertical Angle Theorem |
| 5. $\triangle PRQ \cong \triangle TRS$ | |

- A. $\angle PRQ \cong \angle SRT$ B. Definition of midpoint C. ASA
 D. Given E. R is the midpoint of \overline{QS}

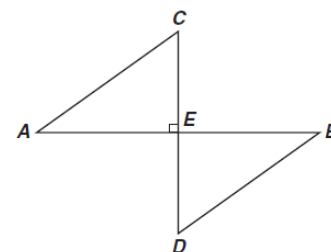
20. Which method listed below could *not* be used to prove that two triangles are congruent?

- A Prove all three sets of corresponding sides congruent.
 B Prove all three sets of corresponding angles congruent.
 C Prove that two sides and an included angle of one triangle are congruent to two sides and an included angle of the other triangle.
 D Prove that two angles and an included side of one triangle are congruent to two angles and an included side of the other triangle.

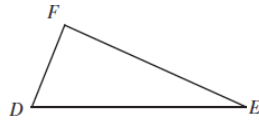
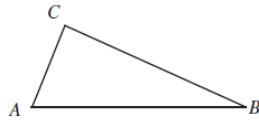
21. Given: E is the midpoint of \overline{AB} , $\angle C \cong \angle D$

Which of the following statements must be true?

- A $\angle A \cong \angle D$
 B $\overline{AE} \cong \overline{ED}$
 C $\overline{CE} \cong \overline{ED}$
 D $\overline{CD} \cong \overline{BA}$

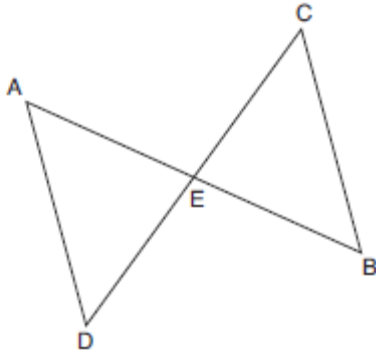


22. In the figure below, $\overline{AC} \cong \overline{DF}$ and $\angle C \cong \angle F$
 Which additional information would be enough to prove $\triangle ABC \cong \triangle DEF$?



- A $\overline{AB} \cong \overline{DE}$
- B $\overline{AB} \cong \overline{BC}$
- C $\overline{BC} \cong \overline{EF}$
- D $\overline{BC} \cong \overline{DE}$

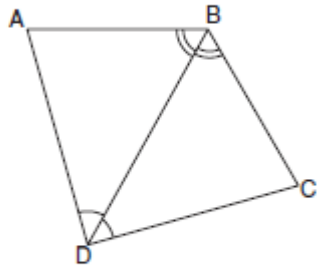
23. In the diagram below of $\triangle DAE$ and $\triangle BCE$, \overline{AB} and \overline{CD} intersect at E , such that $\overline{AE} \cong \overline{CE}$ and $\angle BCE \cong \angle DAE$.



Triangle DAE can be proved congruent to triangle BCE by

- (1) ASA
- (2) SAS
- (3) SSS
- (4) HL

24. The diagram below shows a pair of congruent triangles, with $\angle ADB \cong \angle CDB$ and $\angle ABD \cong \angle CBD$.



Which statement must be true?

- (1) $\angle ADB \cong \angle CBD$
- (2) $\angle ABC \cong \angle ADC$
- (3) $\overline{AB} \cong \overline{CD}$
- (4) $\overline{AD} \cong \overline{CD}$

24. Draw a counterexample for the following statement.

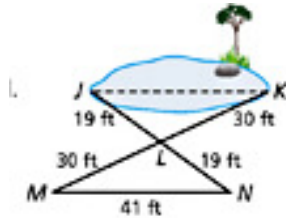
If the 3 angles in one triangle are congruent to the corresponding angles in another triangle, then the 2 triangles are congruent.

I. CPCTC stands for _____.

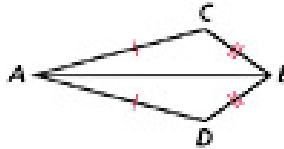
This means that once you have proven the 2 triangles _____, you know that all the _____ parts are also _____.

Examples:

1) Find JK



2) Given: $\overline{AC} \cong \overline{AD}$, $\overline{CB} \cong \overline{DB}$
 Prove: \overline{AB} bisects $\angle CAD$.



Proof:

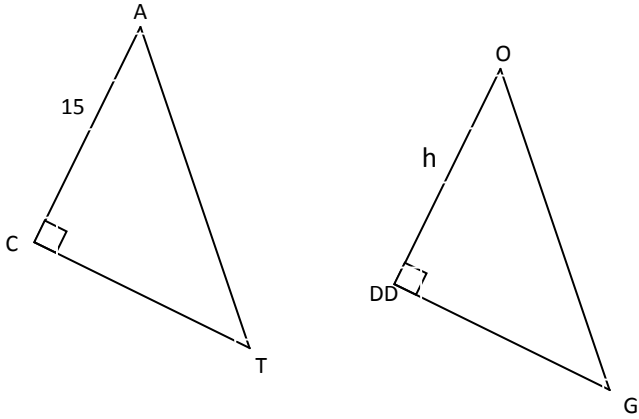
| Statements | Reasons |
|--|-----------------------------|
| 1. $\overline{AC} \cong \overline{AD}$, $\overline{CB} \cong \overline{DB}$ | 1. a. ? |
| 2. b. ? | 2. Reflex. Prop. of \cong |
| 3. $\triangle ACB \cong \triangle ADB$ | 3. c. ? |
| 4. $\angle CAB \cong \angle DAB$ | 4. d. ? |
| 5. \overline{AB} bisects $\angle CAD$ | 5. e. ? |

3) Additional Examples from worksheet: # 3, 5, and 16

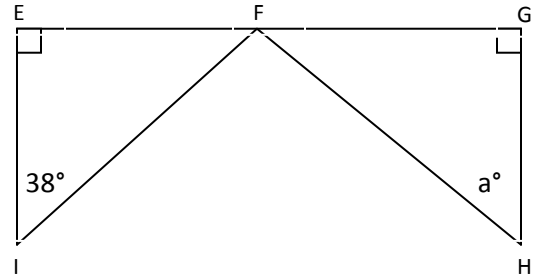
CPCTC Worksheet

I. Solve for the variable.

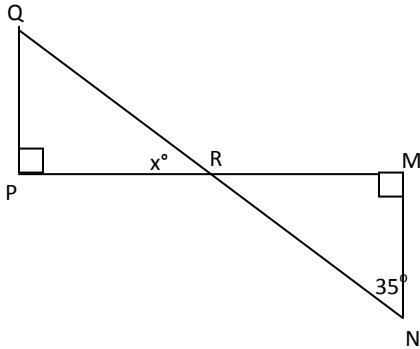
1. $\triangle CAT \cong \triangle DOG$. Find h .



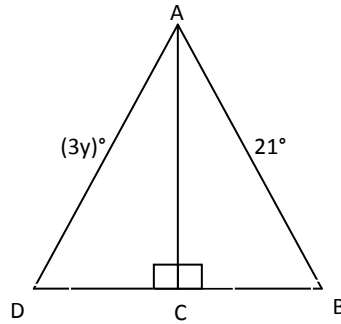
2. $\triangle IEF \cong \triangle HGF$. Find a .



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

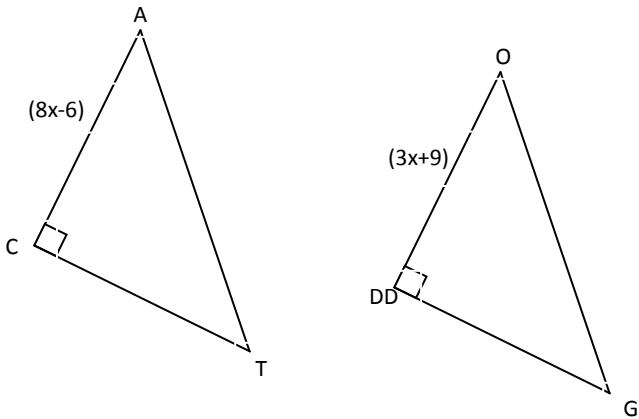


4. $\triangle ABC \cong \triangle ADC$. Find y .

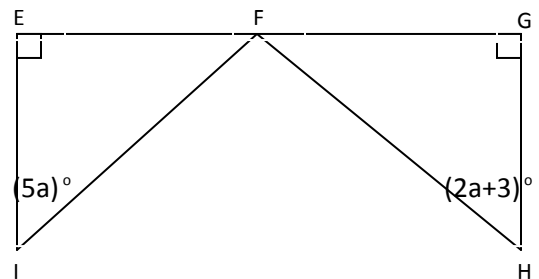


II. Set up an equation and then solve for the variable.

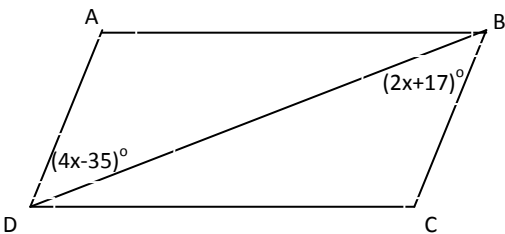
5. $\triangle CAT \cong \triangle DOG$. Find x .



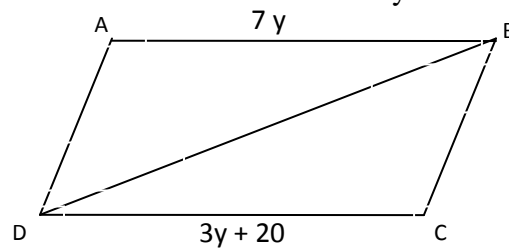
6. $\triangle IEF \cong \triangle HGF$. Find a .



7. $\triangle ABD \cong \triangle CDB$. Find x .

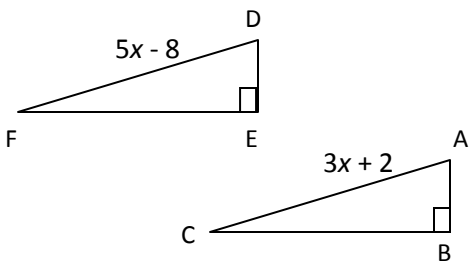


8. $\triangle ABD \cong \triangle CDB$. Find y .

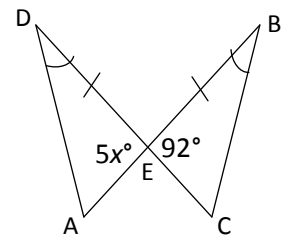


III. For which value(s) of x are the triangles congruent?

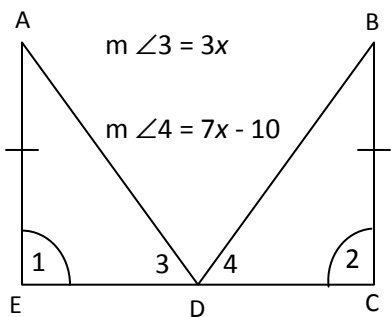
9. $x =$ _____



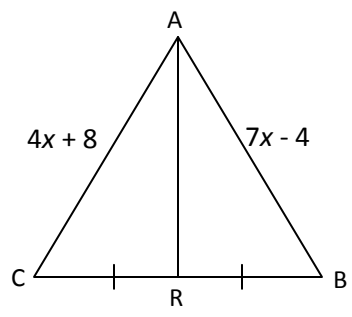
10. $x =$ _____



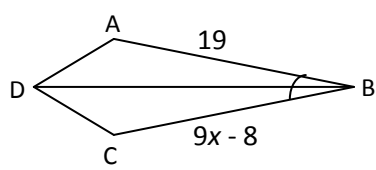
11. $x =$ _____



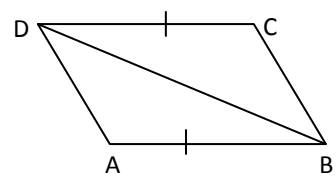
12. $x =$ _____



13. $x =$ _____

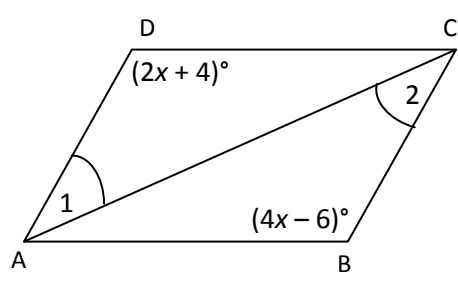


14. $x =$ _____

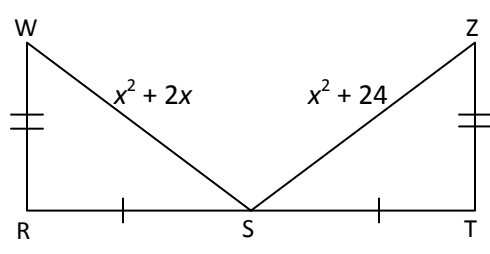


$m\angle CDB = (15x + 3)^\circ$ $m\angle ABD = (10x + 18)^\circ$

15. $x =$ _____



16. $x =$ _____



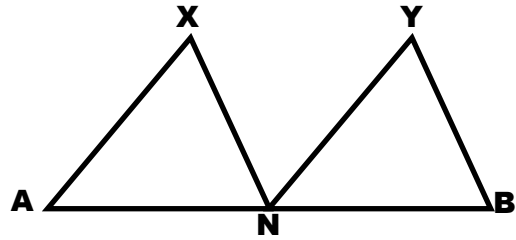
IV. Proofs

17. GIVEN: N is the midpoint of \overline{AB}

$$\overline{AX} \cong \overline{NY}$$

$$\overline{NX} \cong \overline{BY}$$

PROVE: $\angle X \cong \angle Y$

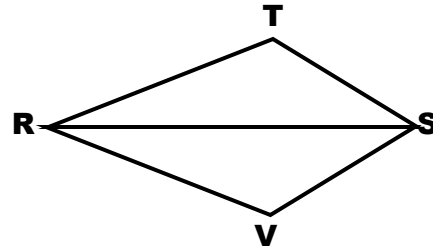


| STATEMENTS | REASONS |
|---|--------------------------|
| 1. N is the midpoint of \overline{AB} | |
| 2. | Definition of a midpoint |
| 3. $\overline{AX} \cong \overline{NY}$ | |
| 4. | Given |
| 5. $\triangle AXN \cong \triangle NYB$ | |
| 6. | CPCTC |

18. GIVEN: $\overline{RT} \cong \overline{RV}$

$$\overline{TS} \cong \overline{VS}$$

PROVE: $\angle RST \cong \angle RSV$

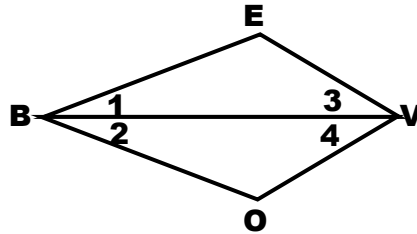


| STATEMENTS | REASONS |
|----------------------------------|-----------|
| 1. | Given |
| 2. | |
| 3. | Reflexive |
| 4. | SSS |
| 5. $\angle RST \cong \angle RSV$ | |

19. GIVEN: \overline{VB} bisects $\angle EVO$

$$\overline{BV} \text{ bisects } \angle EBO$$

PROVE: $\angle E \cong \angle O$



| STATEMENTS | REASONS |
|---|------------------------------|
| 1. \overline{VB} bisects $\angle EVO$ | |
| 2. | Definition of Angle Bisector |
| 3. | Given |
| 4. $\angle 1 \cong \angle 2$ | |
| 5. $\overline{BV} \cong \overline{BV}$ | |
| 6. | ASA |
| 7. $\angle E \cong \angle O$ | |