

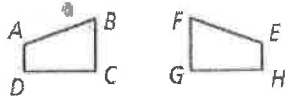
Honors Geometry
Section 4.1 Notes
Congruent Figures

Name: Key

Key Definitions:

- Congruent figures have the same size and shape.
- Congruent polygons have congruent corresponding sides and angles.

Example



$$ABCD \cong EFGH$$

$$\begin{array}{l} \overline{AB} \cong \overline{EF} \\ \overline{CD} \cong \overline{GH} \end{array} \quad \begin{array}{l} \overline{BC} \cong \overline{FG} \\ \overline{DA} \cong \overline{HE} \end{array}$$

$$\begin{array}{l} \angle A \cong \angle E \\ \angle C \cong \angle G \end{array} \quad \begin{array}{l} \angle B \cong \angle F \\ \angle D \cong \angle H \end{array}$$

*When naming congruent polygons, you must list corresponding vertices in the same order.

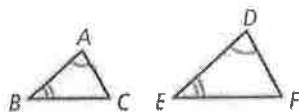
- The third angles theorem says that if two angles of one triangle are congruent to two angles of another triangle, then the third angles are also congruent.

If ...

$$\angle A \cong \angle D \text{ and } \angle B \cong \angle E$$

Then ...

$$\angle C \cong \angle F$$



Practice Problems

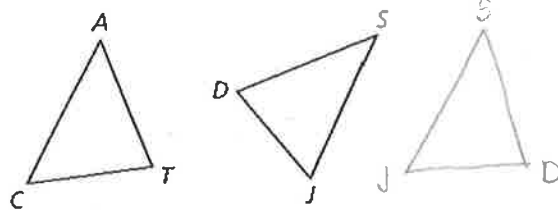
If $\triangle CAT \cong \triangle JSD$. List each of the following.

- Three pairs of congruent angles.

$$\angle A \cong \angle S, \angle C \cong \angle J, \angle T \cong \angle D$$

- Three pairs of congruent sides.

$$\overline{AC} \cong \overline{SJ}, \overline{AT} \cong \overline{SD}, \overline{CT} \cong \overline{JD}$$



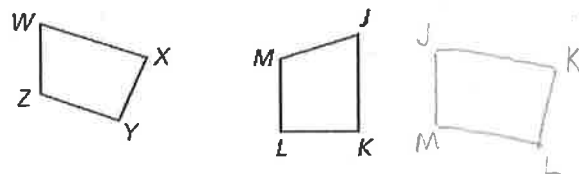
If $WXYZ \cong JKLM$. List each of the following.

- Four pairs of congruent angles.

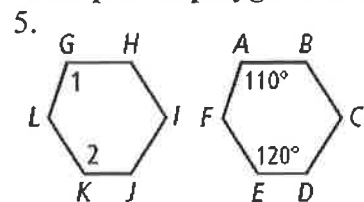
$$\angle W \cong \angle J, \angle X \cong \angle K, \angle Z \cong \angle L, \angle Y \cong \angle M$$

- Four pairs of congruent sides.

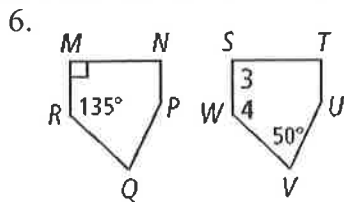
$$\overline{WX} \cong \overline{JK}, \overline{XY} \cong \overline{KL}, \overline{YZ} \cong \overline{LM}, \overline{WZ} \cong \overline{JM}$$



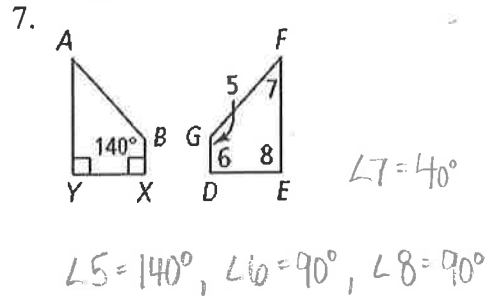
Each pair of polygons are congruent. Find the measures of the numbered angles.



$$\angle 1 = 110^\circ, \angle 2 = 120^\circ$$



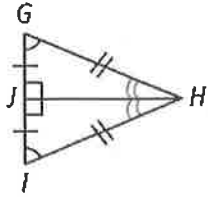
$$\angle 3 = 90^\circ, \angle 4 = 135^\circ$$



$$\angle 5 = 140^\circ, \angle 6 = 90^\circ, \angle 8 = 90^\circ$$

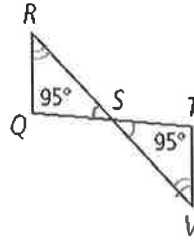
Can you conclude that the following polygons are congruent? Justify your answers.

8. $\triangle GHJ$ and $\triangle IHJ$



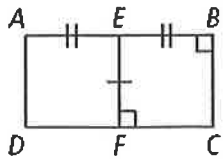
Yes, ①. Third angle theorem
②. Same side theorem

9. $\triangle QRS$ and $\triangle TVS$



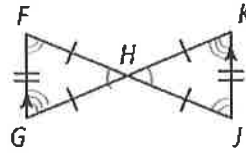
No, Angles are but not sides

10. $AEFD$ and $EBCF$



No, Angles are but not sides

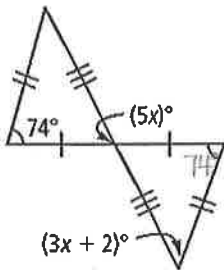
11. $\triangle FGH$ and $\triangle JKH$



Yes, ①. All three sides
②. Vertical Angles
③. AIA

Find the values of the variables.

12.



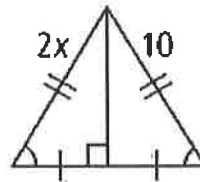
$$5x + 3x + 2 + 74 = 180$$

$$5x + 76 = 180$$

$$5x = 104$$

$$x = 20.8$$

13.



$$2x = 10$$

$$x = 5$$

If $ABCD \cong FGHJ$. Find the value of each variable and the measures of the given angles or lengths of the given sides.

14. $m\angle B = 3y$, $m\angle G = y + 50$

$$3y = y + 50$$

$$2y = 50$$

$$y = 25$$

$$m\angle B = 3(25)$$

$$= 75^\circ$$

$$m\angle G = 25 + 50 = 75^\circ$$

15. $CD = 2x + 3$; $HJ = 3x + 2$

$$2x + 3 = 3x + 2$$

$$x = 1$$

$$CD = 2(1) + 3$$

$$= 5$$

$$HJ = 3(1) + 2 = 5$$

16. $m\angle C = 5z + 20$, $m\angle H = 6z + 10$

$$5z + 20 = 6z + 10$$

$$z = 10$$

$$m\angle C = 5(10) + 20$$

$$= 70^\circ$$

$$m\angle H = 6(10) + 10$$

$$= 70^\circ$$

17. $AD = 5b + 4$; $FJ = 3b + 8$

$$5b + 4 = 3b + 8$$

$$2b = 4$$

$$b = 2$$

$$AD = 5(2) + 4$$

$$= 14$$

$$FJ = 3(2) + 8$$

$$= 14$$