

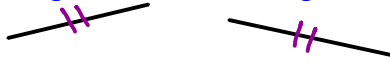
Section 4.2: Apply Congruence and Triangle

EQ: What are congruent figures?

Vocabulary:

Congruent segments:

Line segments w/same length

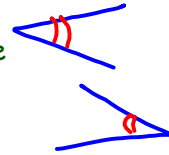


Congruent figures:

- figures w/same size & shape
- corresponding sides & angles are congruent

Congruent angles:

Angles w/same measure



Corresponding parts:

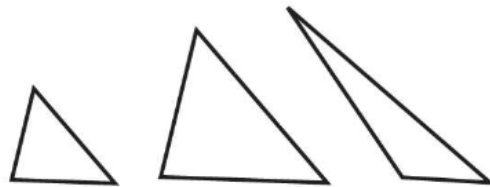
Sides or angles in same relative position in two figures

Congruent

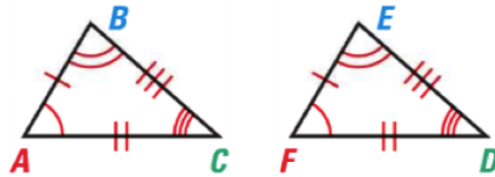


Same size and shape

Not congruent



Different sizes or shapes



In two **congruent figures**, all the parts of one figure are congruent to the **corresponding parts** of the other figure. In congruent polygons, this means that the *corresponding sides* and the *corresponding angles* are congruent.

A1. In the diagram, $\triangle EFG \cong \triangle OPQ$. Complete the statement.

a. $\overline{EF} \cong \underline{\overline{OP}}$

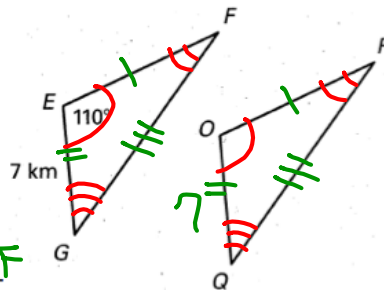
b. $\angle P \cong \underline{\angle F}$

c. $\angle G \cong \underline{\angle Q}$

d. $m\angle O = \underline{110^\circ}$
 $m\angle E = \underline{110^\circ}$

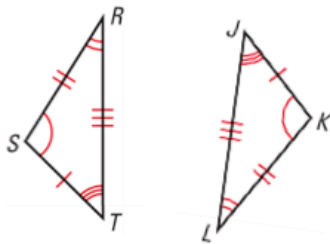
e. $QO = \underline{7 \text{ km}}$

f. $\triangle QOP \cong \underline{\triangle GEF}$



$GE = 7$

A2. Write a congruence statement for the triangles. Identify all pairs of corresponding congruent parts

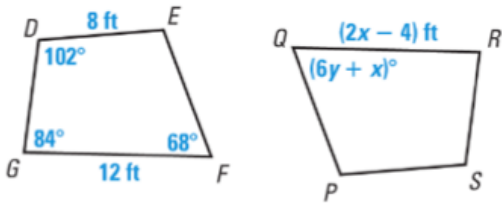


$$\triangle SRT \cong \triangle K LJ$$

$$\triangle RTS \cong \triangle LJK$$

$$\begin{array}{ll} \angle R \cong \angle L & \overline{SR} \cong \overline{KL} \\ \angle S \cong \angle K & \overline{RT} \cong \overline{LJ} \\ \angle T \cong \angle J & \overline{TS} \cong \overline{JK} \end{array}$$

A3. In the diagram below, $DEFG \cong SPQR$. Find the values of x and y .



$$\overline{QR} \cong \overline{FG}$$

$$2x - 4 = 12$$

$$\begin{array}{r} +4 \quad +4 \\ \hline 2x = 16 \\ \hline \frac{2x}{2} = \frac{16}{2} \end{array}$$

$$\boxed{x = 8}$$

$$\angle Q \cong \angle F$$

$$6y + x = 68$$

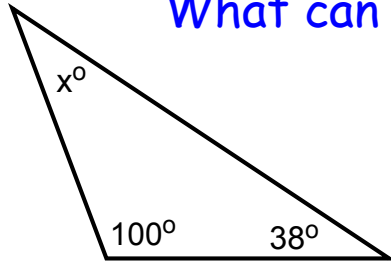
$$6y + 8 = 68$$

$$\begin{array}{r} -8 \quad -8 \\ \hline 6y = 60 \end{array}$$

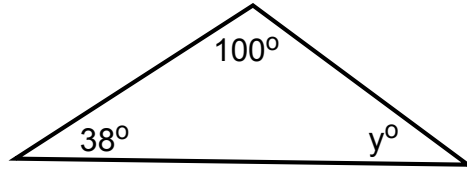
$$6y = 60$$

$$\frac{6y}{6} = \frac{60}{6} \quad \boxed{y = 10}$$

What can be stated about x and y ?



$$\begin{aligned} 100 + 38 + x &= 180 \\ -138 & \\ x &= 42^\circ \end{aligned}$$



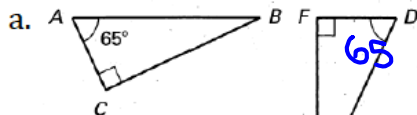
$$\begin{aligned} 100 + 38 + y &= 180 \\ -138 & \\ y &= 42^\circ \end{aligned}$$

If 2 \angle 's are \cong so is the 3rd \angle .

Theorem 4.3: Third Angles Theorem

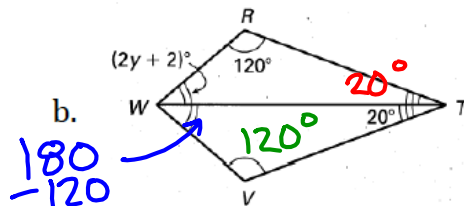
If two angles of one triangle are congruent to two angles of another triangle, then the third angles are also congruent.

A4. Find the value of y .



Δ sum corollary

$$\begin{aligned} 65 + y &= 90 \\ -65 & \\ \boxed{y = 25^\circ} \end{aligned}$$



$$\begin{aligned} 180 & \\ -120 & \\ -20 & \\ \hline 40^\circ & \end{aligned} \quad \therefore 2y + 2 = 40$$

$$2y = 38$$

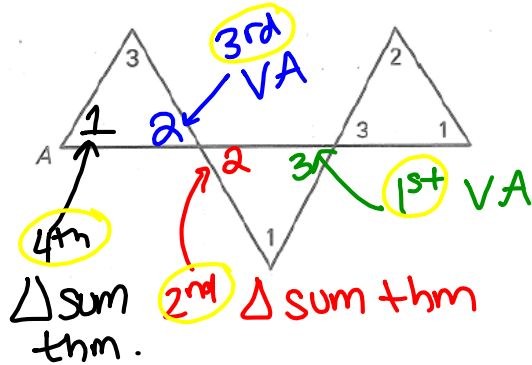
OR

$$\begin{aligned} 2y + 2 + 120 + 20 &= 180 \\ 2y + 142 &= 180 \\ 2y &= 38 \end{aligned}$$

$$\boxed{y = 19}$$

A3. Complete the statement ...

$\angle A \cong \angle 1$ because
VA, Δ sum thm,
VA, Δ sum thm



Theorem 4.4: Properties of Congruent Triangles

Reflexive Property

For any triangle ABC , $\Delta ABC \cong \underline{\Delta ABC}$.

Symmetric Property

If $\Delta ABC \cong \Delta DEF$ then $\underline{\Delta DEF \cong \Delta ABC}$

Transitive Property

If $\Delta ABC \cong \Delta DEF$ and $\Delta DEF \cong \Delta JKL$, then $\underline{\Delta ABC \cong \Delta JKL}$

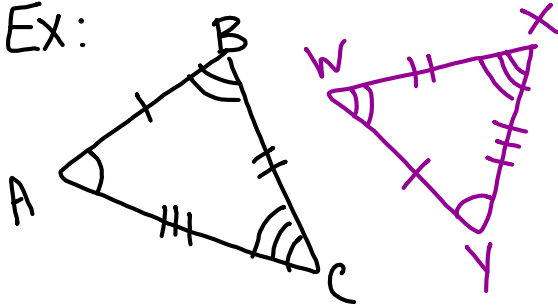
Section 4.2

\cong figures have same shape & size

Summary:

corresponding sides are \cong
 corresponding \angle s are \cong

Ex:



$$\triangle ABC \cong \triangle YWX$$

$$\begin{aligned} \angle A &\cong \angle Y \\ \angle B &\cong \angle W \\ \angle C &\cong \angle X \end{aligned}$$

$$\begin{aligned} \overline{AB} &\cong \overline{YW} \\ \overline{BC} &\cong \overline{WX} \\ \overline{CA} &\cong \overline{XY} \end{aligned}$$