

4.2: Congruence + Triangles

Objective: Identify congruent figures and corresponding parts
 Prove that two triangles are congruent

Identifying Congruent Figures

- Figures are congruent when their corresponding parts are congruent
- Corresponding angles are angles in two different figures that have the same measure
- Corresponding sides are line segments in two different figures that have the same measure

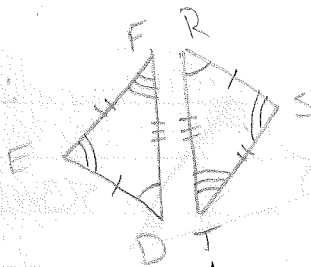
ex

$$\triangle ABC \cong \triangle PQR$$



$$\begin{aligned} \angle A &\cong \angle P & \overline{AB} &\cong \overline{PQ} \\ \angle B &\cong \angle Q & \overline{BC} &\cong \overline{QR} \\ \angle C &\cong \angle R & \overline{CA} &\cong \overline{RP} \end{aligned}$$

Now try:

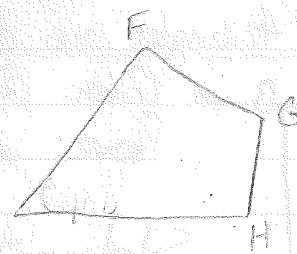
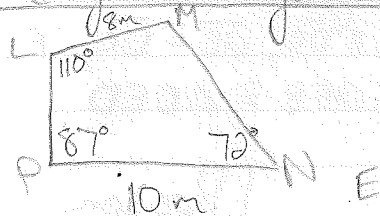


$$\triangle DEF \cong \triangle RST$$

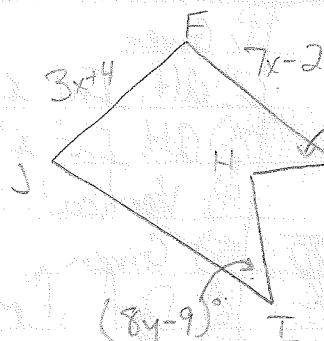
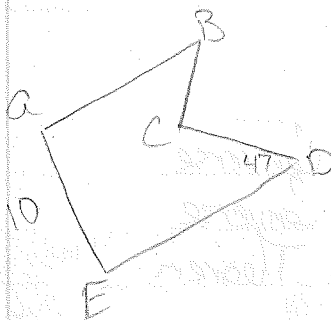
Name the corresponding angles and sides

Using Properties of Congruent Figures

$$\triangle NPLM \cong \triangle EFGH$$



Find $m\angle F$
 $m\angle G$
 $m\angle E$
 \overline{GH}
 \overline{EF}



$$\triangle ABCDE \cong \triangle FGHIJ$$

Find the value of $x + y$

Theorem 4.3 Third Angles Theorem

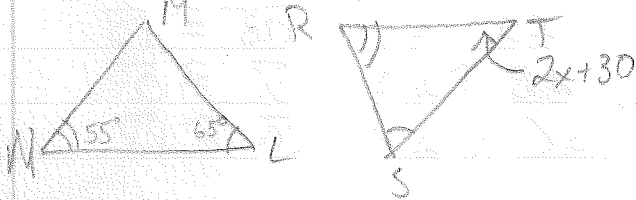
If two angles of one triangle are congruent to two angles of another triangle, then the third angles are always congruent



If $\angle A \cong \angle D$ and $\angle B \cong \angle E$, then $\angle C \cong \angle F$

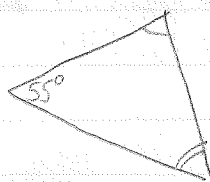
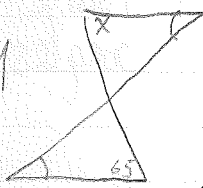
Using the 3rd Angles Theorem

$$\triangle LMN \cong \triangle SRT$$

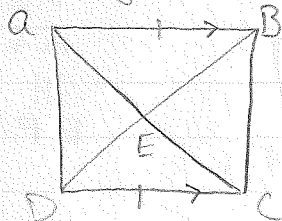


Solve for x

Now try



Proving two triangles are congruent



Given: $\overline{AB} \parallel \overline{DC}$, $\overline{AB} \cong \overline{DC}$, E is the midpoint of \overline{BD} and \overline{AC}
 Prove: $\triangle AEB \cong \triangle CED$

Statement	Reason
1) $\overline{AB} \parallel \overline{DC}$	1) Given
2) $\angle EAB \cong \angle ECD$	2) alt. Int \angle 's Converse
3) $\angle EBA \cong \angle EDC$	3) alt. Int \angle 's Converse
4) $\angle AEB \cong \angle CED$	4) Vertical \angle 's Theorem
5) E is the midpoint of \overline{AD}	5) Given
6) $\overline{AE} \cong \overline{EC}$, $\overline{BE} \cong \overline{ED}$	6) Def of midpoint
7) $\overline{AB} \cong \overline{DC}$	7) Given
8) $\triangle AEB \cong \triangle CED$	8) Def of congruent triangles

Theorem 4.4

Triangles are reflexive, symmetric, and transitive

Closure

How can we show triangles are congruent? What is the third angle theorem?

Homework 4.2B