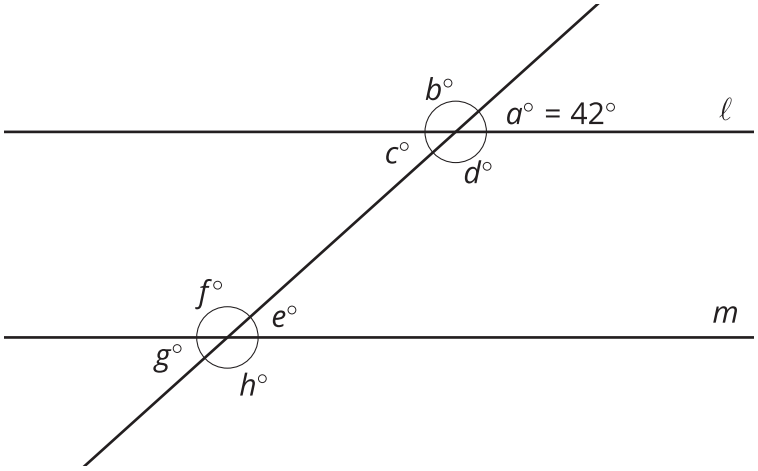
Congruent Parts, Part 1

Let's figure out what the corresponding sides and angles in figures have to do with congruence.

1.1 Find the Missing Angle Measures

Lines ℓ and m are parallel. $a = 42$. Find b, c, d, e, f, g, and h.

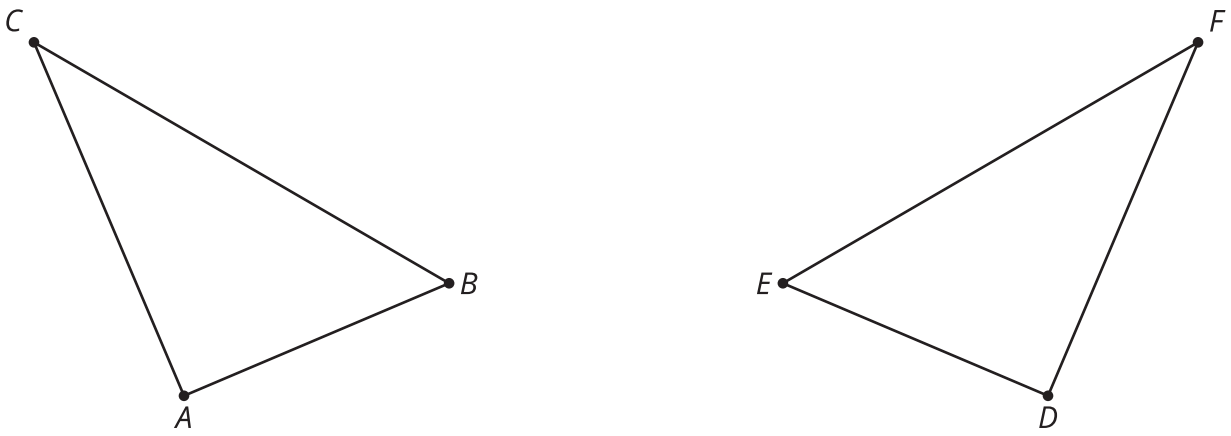
$\ell \parallel m$



1.2 If We Know This, Then We Know That

Triangle ABC is congruent to triangle DEF.

$\triangle ABC \cong \triangle DEF$



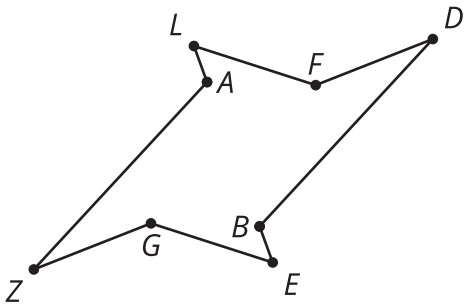
1. Find a sequence of rigid motions that takes triangle ABC to triangle DEF.

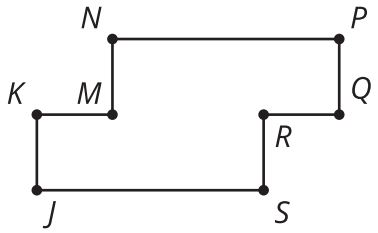
2. What is the image of segment BC after that transformation?
3. Explain how you know those segments are congruent.

4. Justify that angle ABC is congruent to angle DEF.

Are you ready for more?

For each figure, draw additional line segments to divide the figure into 2 congruent polygons. Label any new vertices, and identify the corresponding vertices of the congruent polygons.





1.3 Making Quadrilaterals

1. Draw a triangle.

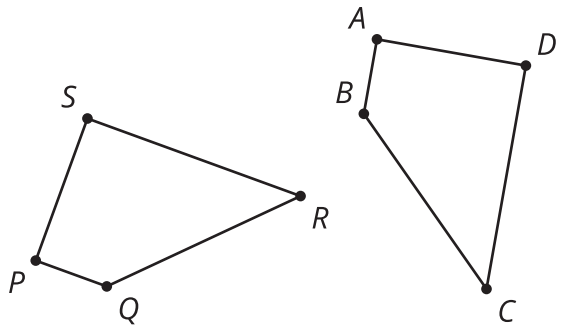
2. Find the midpoint of the longest side of your triangle.
3. Rotate your triangle 180° using the midpoint of the longest side as the center of the rotation.
4. Identify the **corresponding parts**, and mark which segments and angles must be congruent.
5. Make a conjecture and justify it.
   a. What type of quadrilateral have you formed?
   b. What is the definition of that quadrilateral type?

   c. Why must the quadrilateral you have fit the definition?

Lesson 1 Summary

If a part of the image matches up with a part of the original figure, we call them **corresponding parts**. The part could be an angle, point, or side. We can find corresponding angles, corresponding points, or corresponding sides.

If two figures are congruent, then there is a rigid transformation that takes one figure onto the other. The same rigid transformation can also be applied to individual parts of the figure, such as segments and angles, because rigid transformations act on every point on the plane. Therefore, the corresponding parts of two congruent figures are congruent to each other.



Using a translation and a rotation we can take quadrilateral $ABCD$ to quadrilateral $PQRS$. Now that we know the two figures are congruent, we also know that all the corresponding parts are congruent. Each of these statements (and more!) must be true:

- Angle P is congruent to angle A.
- Segment BC is congruent to segment QR.
- Angle D is congruent to angle S.
- Segment PS is congruent to segment AD.