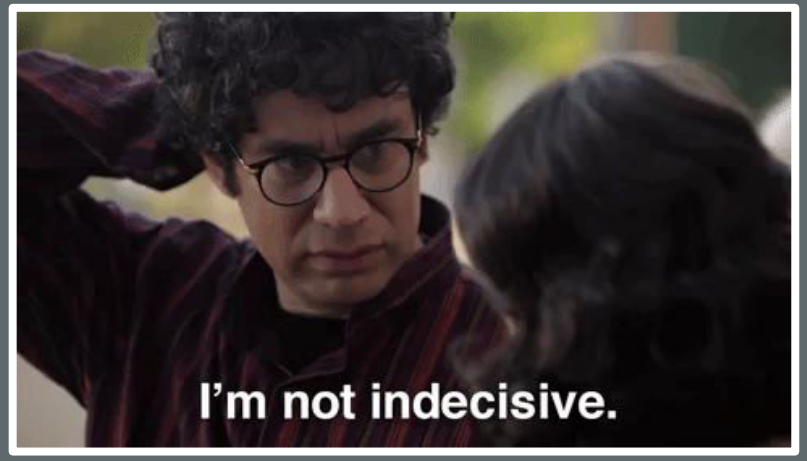
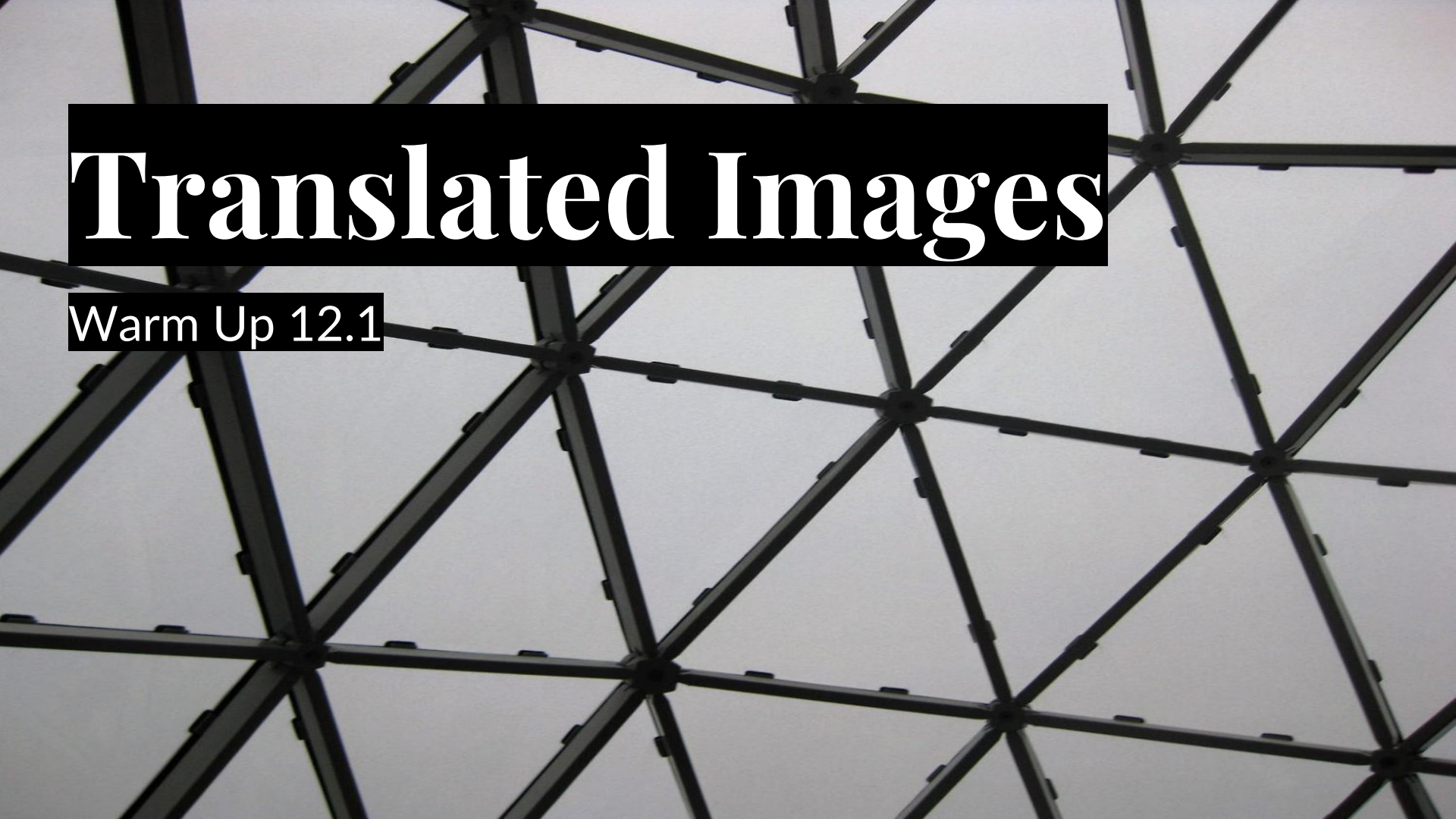
# Congruent Polygons

Lesson 12

| CCSS Standards: Addressing | • 8.G.A.2 |
| --- | --- |

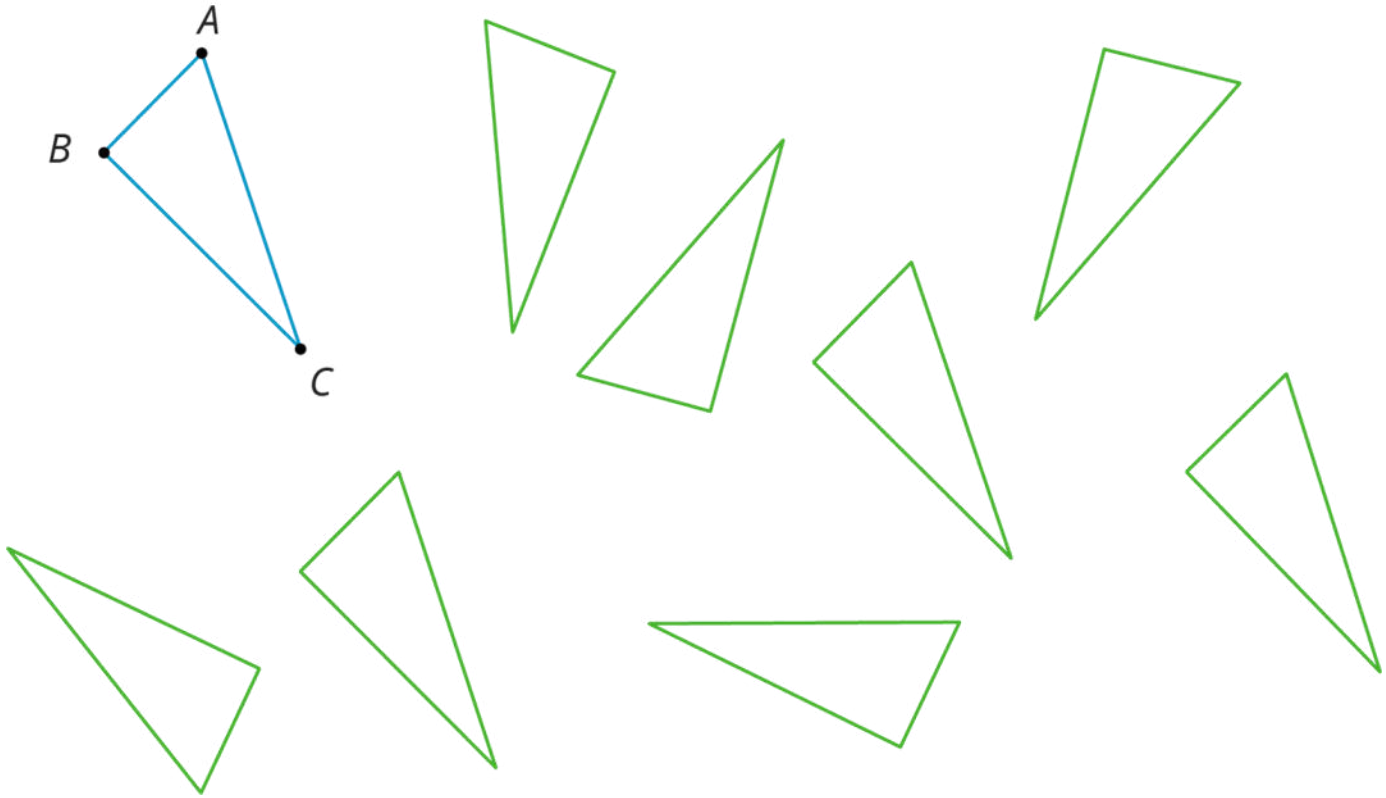
Let's decide if two figures are congruent!





# Translated Images

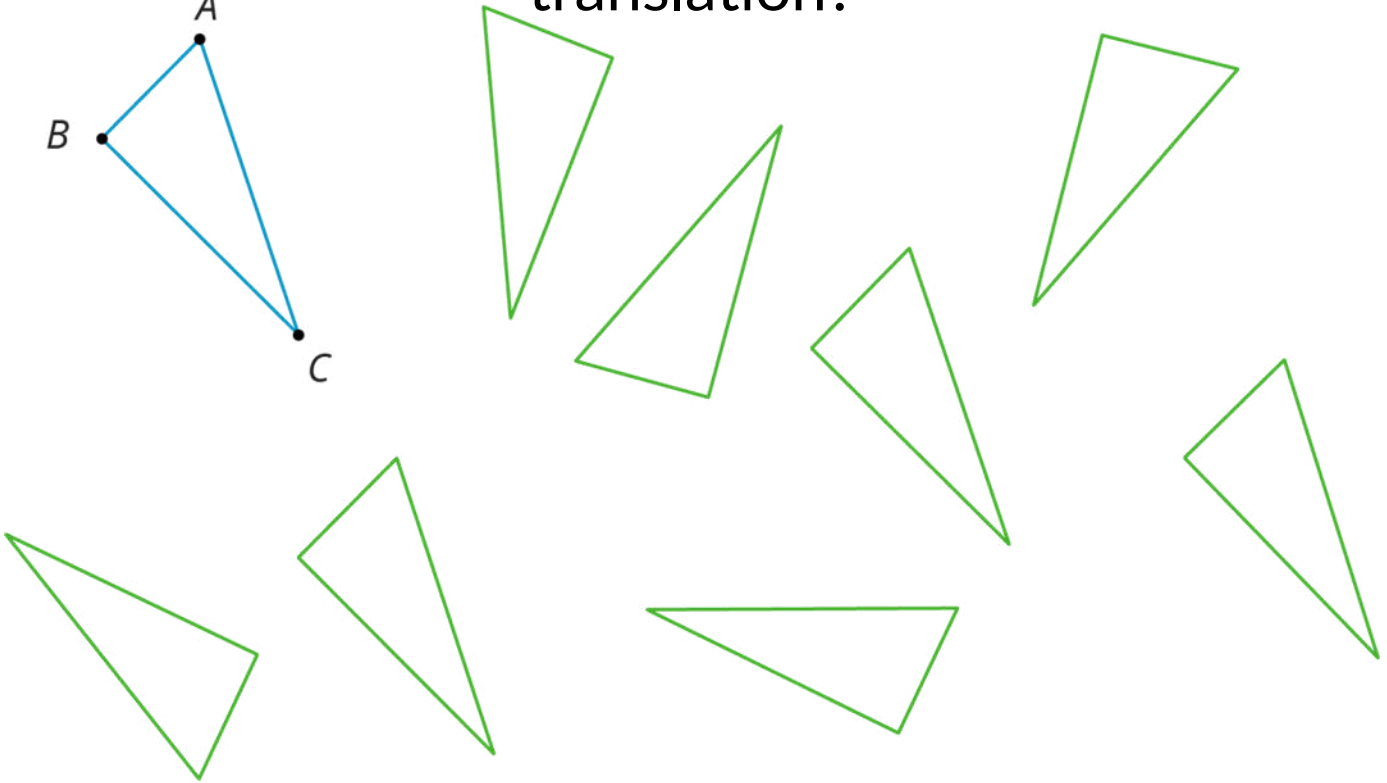
Warm Up 12.1



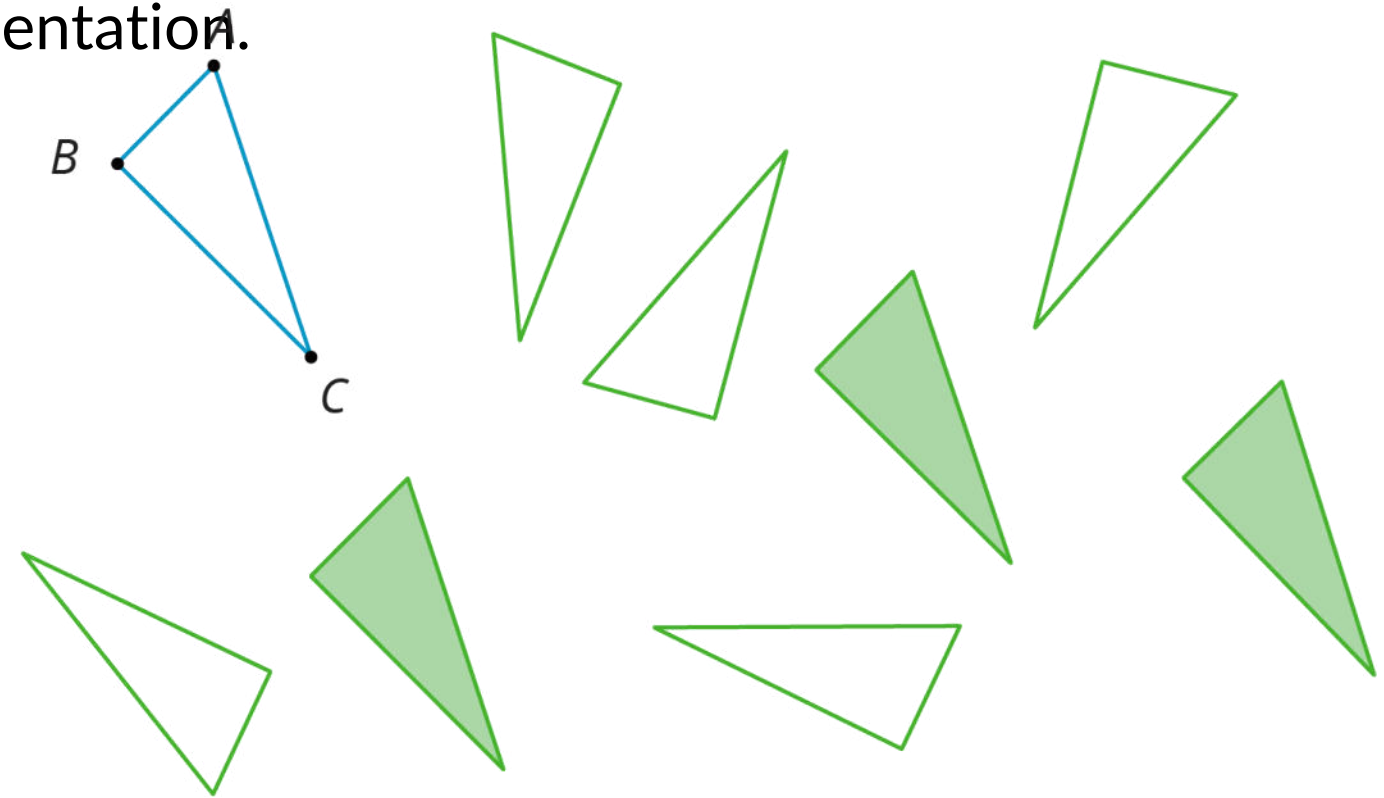

**Begin with Quiet Work Time.** (2 min)

Which triangles are images of triangle *ABC* under a translation?

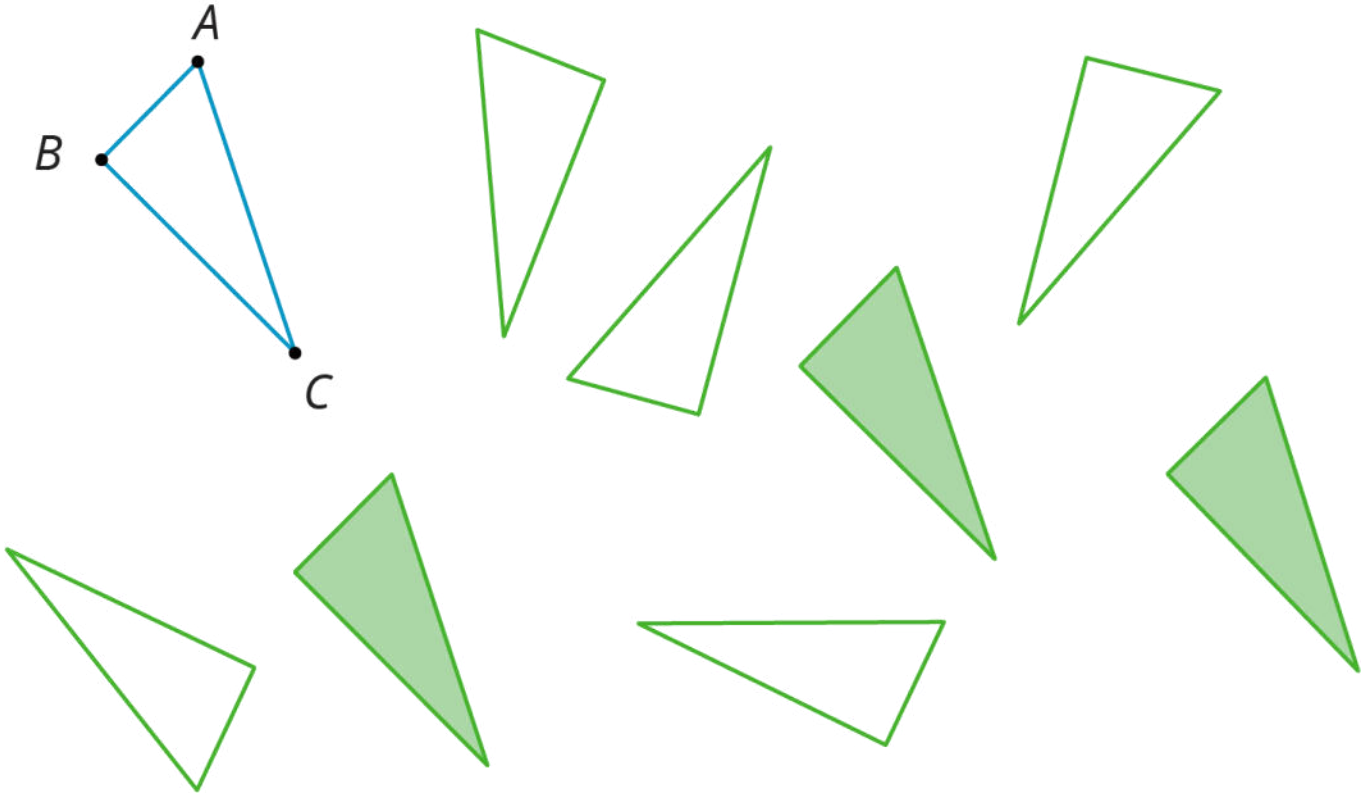


If we just **translate** a figure, the image will end up pointed up in the same direction. It will have the same mirror and rotational orientation.



What **sequence of transformations** would show that the other triangles are congruent?



# Congruent Pairs (Part 1)

Activity 12.2

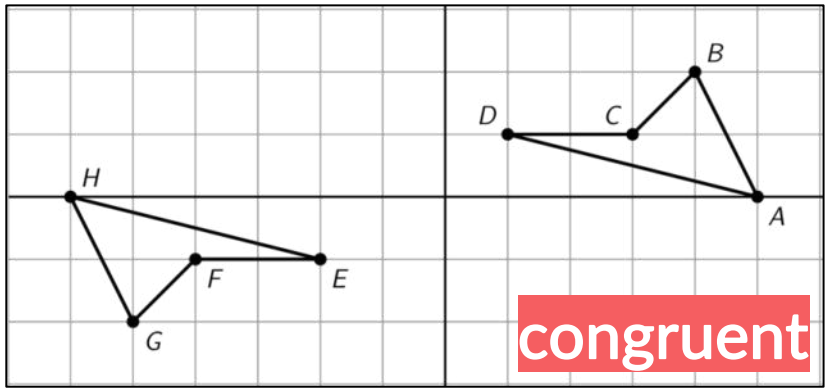
- 5 Practices

# Begin with Quiet Work Time. (5-10 min)

**Remember to give specific explanations in your work!**

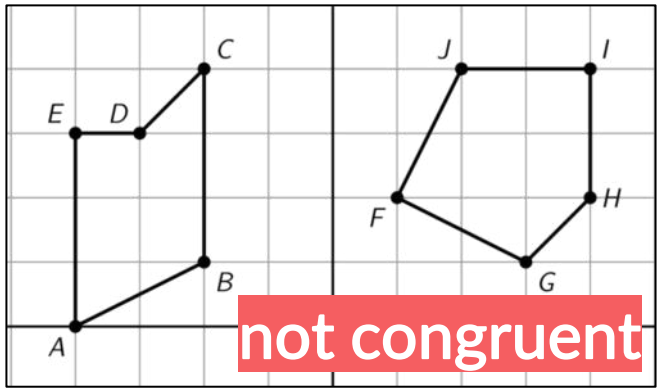
# Are these shapes congruent?

1



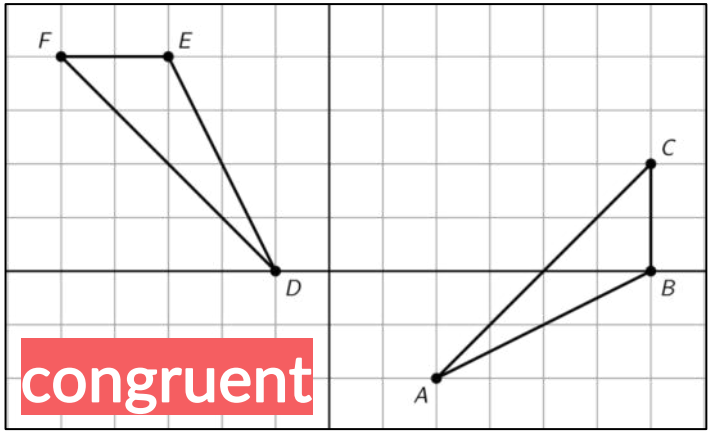

congruent

2



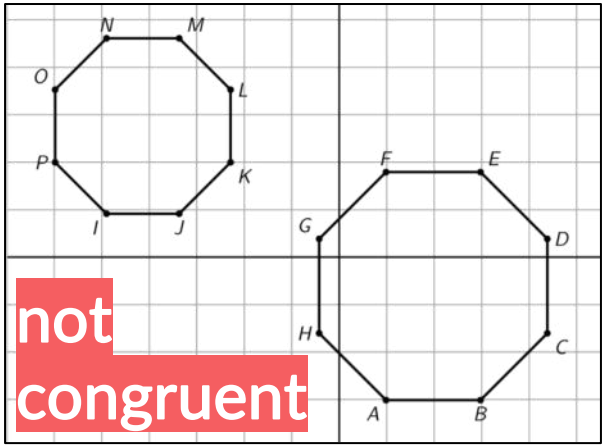

not congruent

3



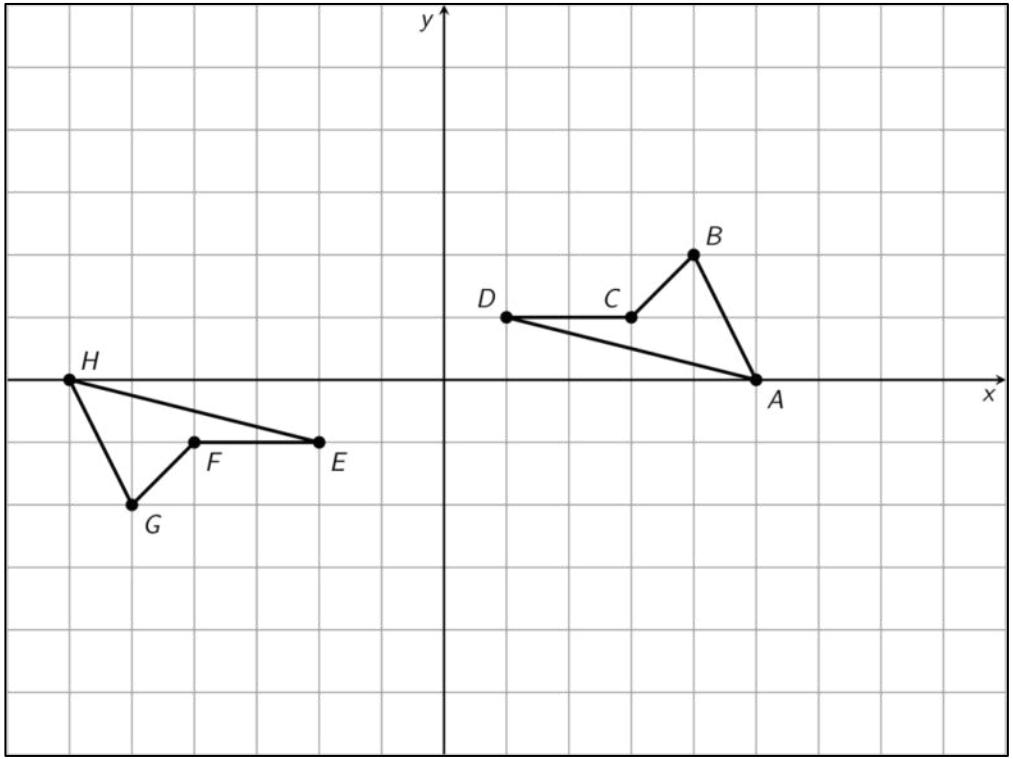

congruent

4

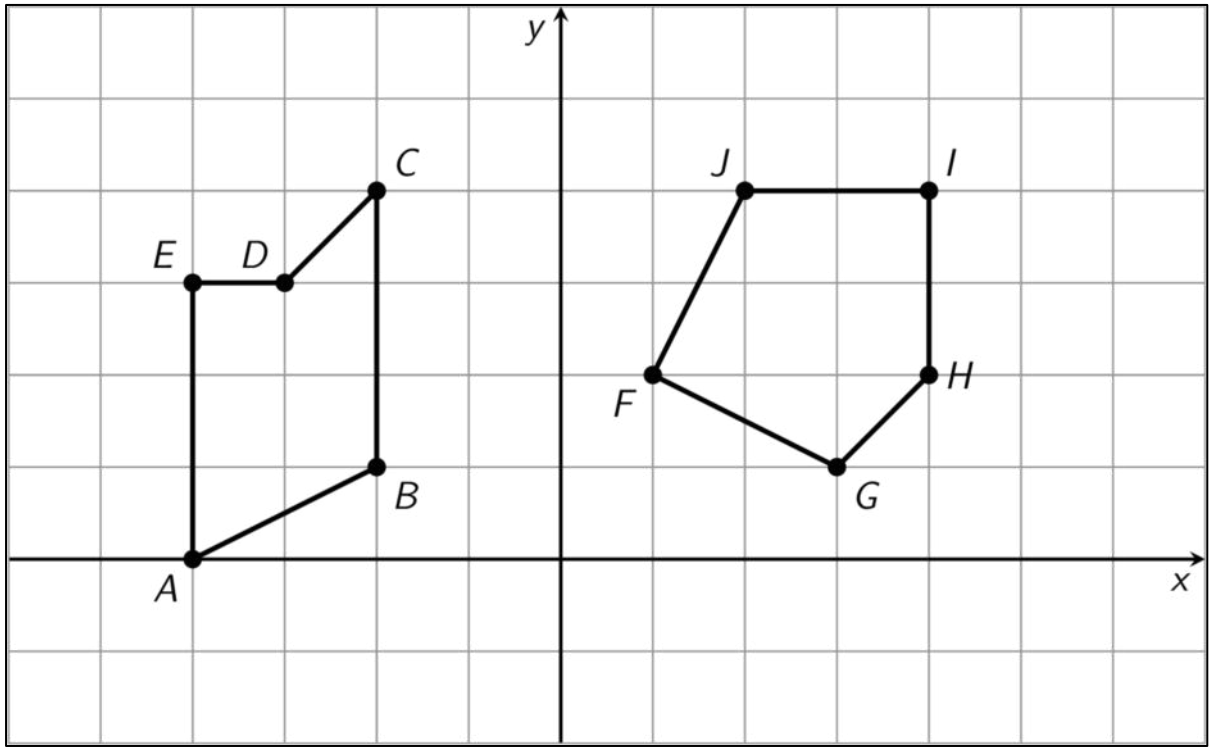



not congruent

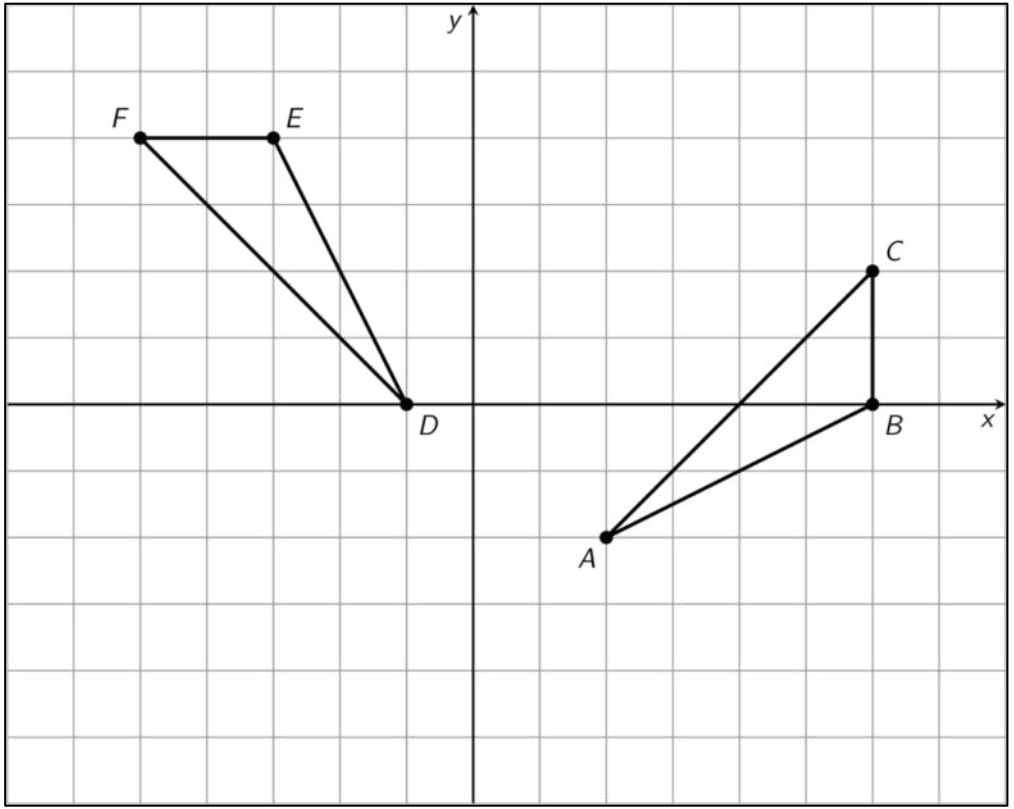
# Which motions (translations, rotations, or reflections) did you use?



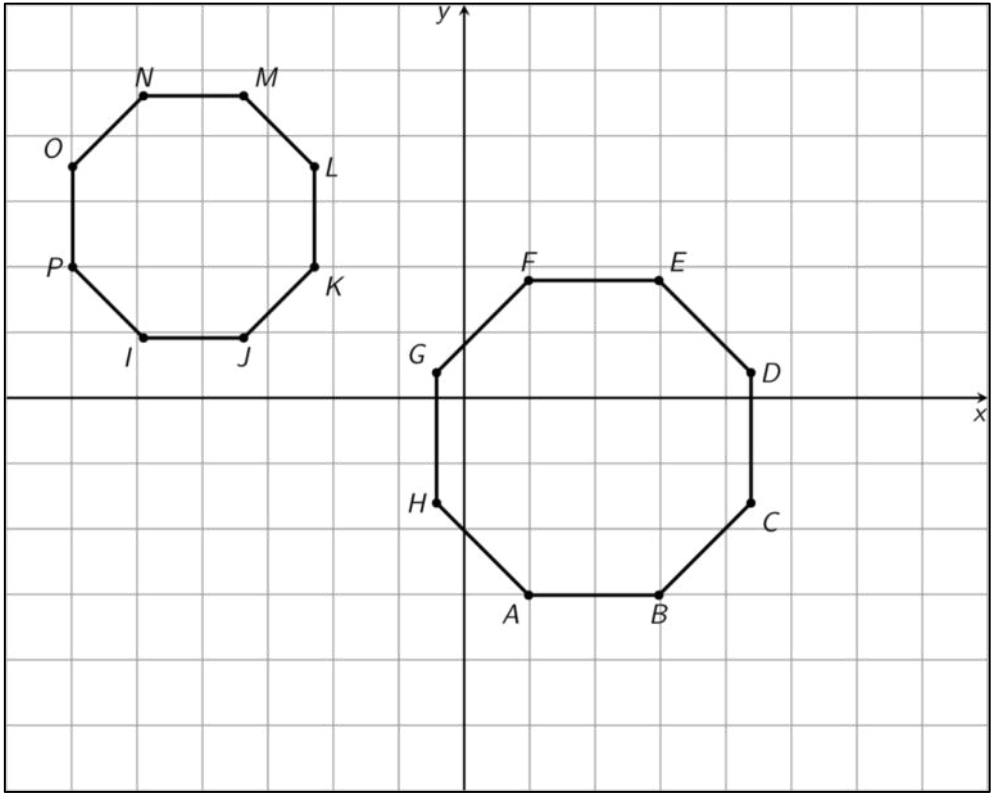
What features show that the shapes are not congruent? Did you try to move one shape onto the other? What happened?



# Which motions (translations, rotations, or reflections) did you use?

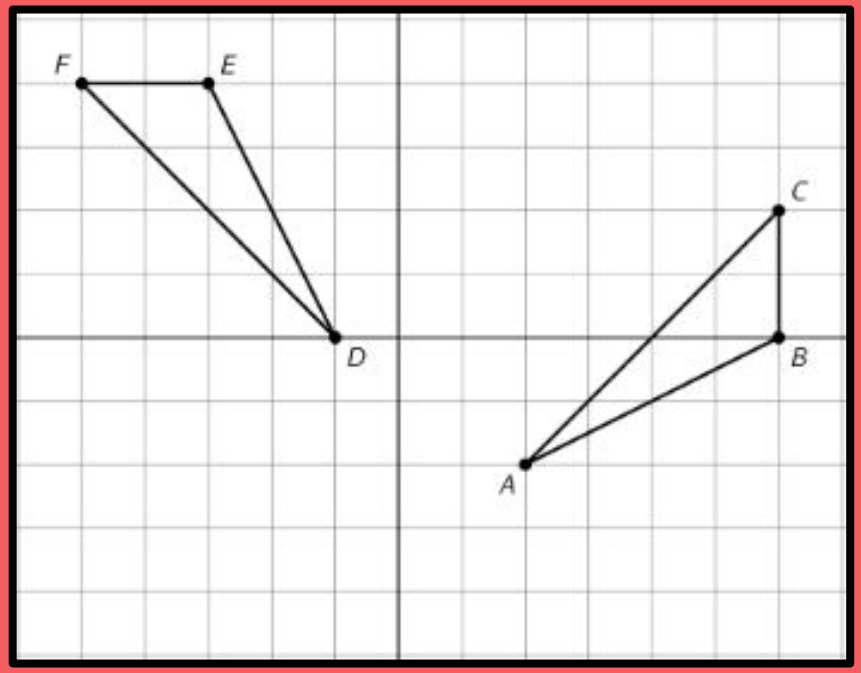


# What features show that the shapes are not congruent? Did you try to move one shape onto the other? What happened?



When two shapes are **congruent**,

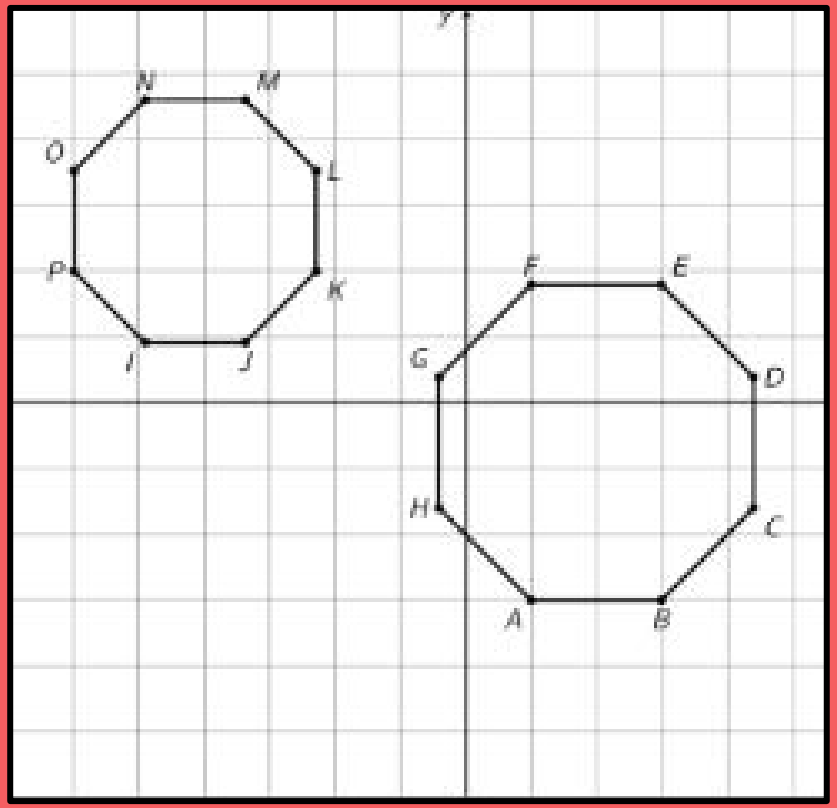
there is a **rigid transformation** that matches one shape up perfectly with the other.



When two shapes are **not congruent**,

there is **not a rigid transformation** that matches the shapes up perfectly.

Example: Transformations do not change side lengths.



# Congruent Pairs (Part 2)

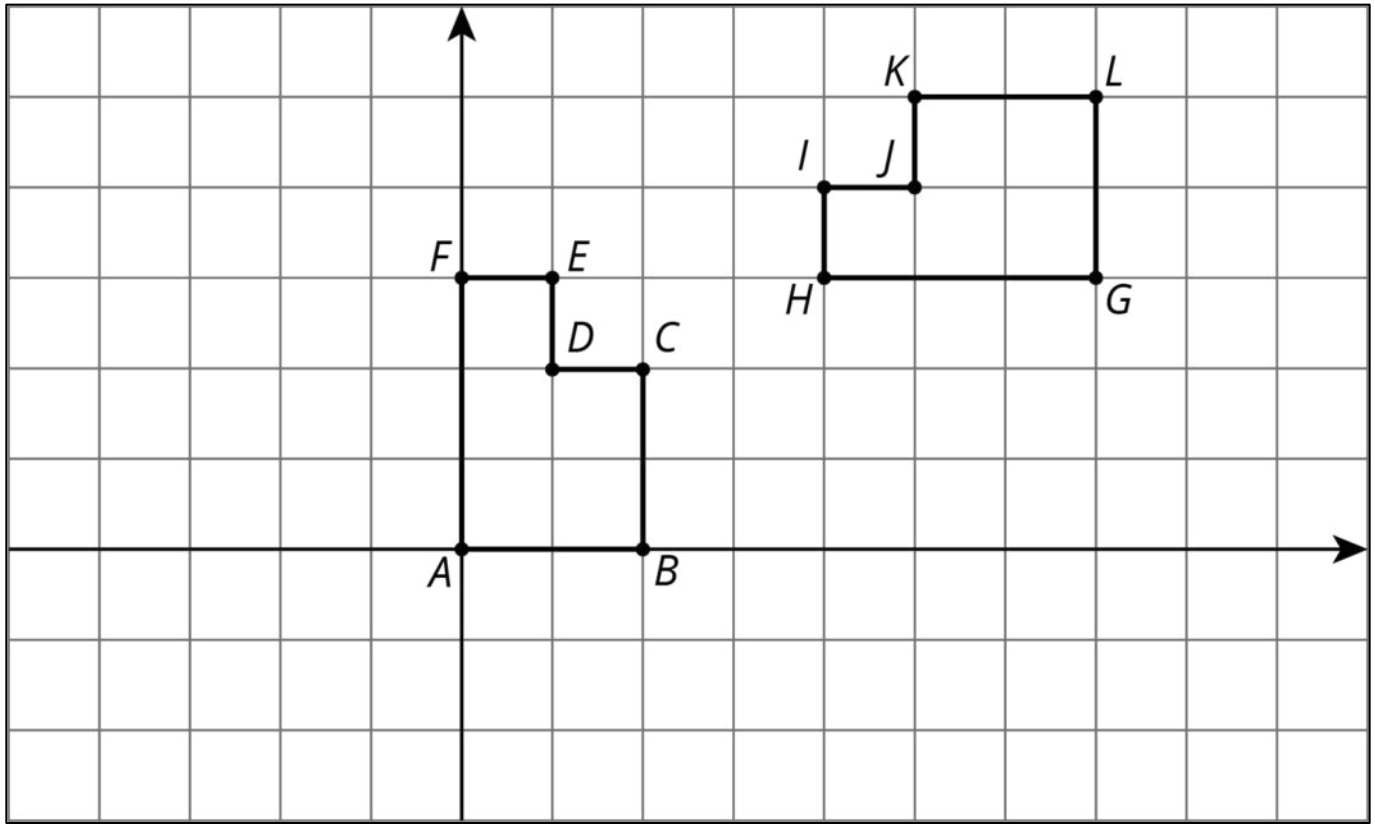
Activity 12.3

- Take Turns

## You will take turns with your partner on each question.

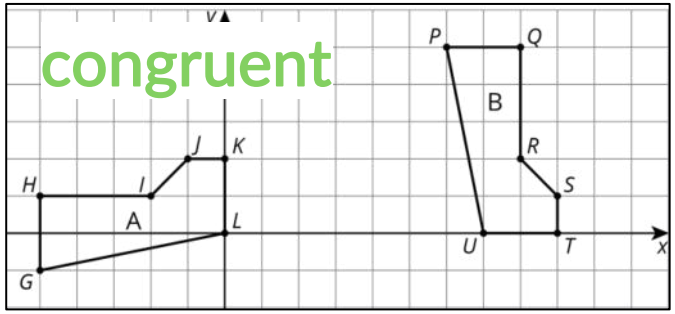
- For Question 1, Student A will claim whether the shapes are congruent or not.
  - If they're **congruent**, describe a sequence of transformations to show congruence. Student B will check by performing the transformations.
  - If they're **not congruent**, convince Student B with an explanation that they're not congruent shapes.
- For each questions, exchange roles!

# Let's try it together!

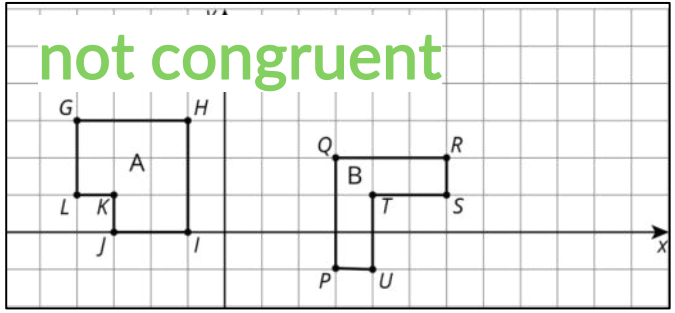


# Let's check our answers!

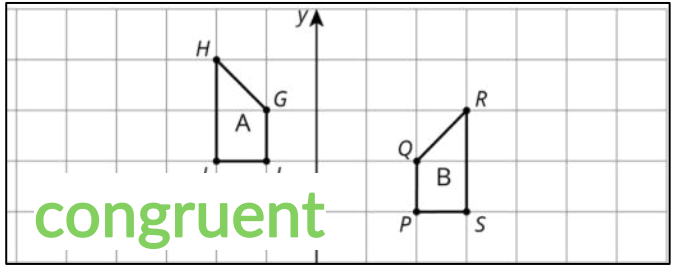
congruent



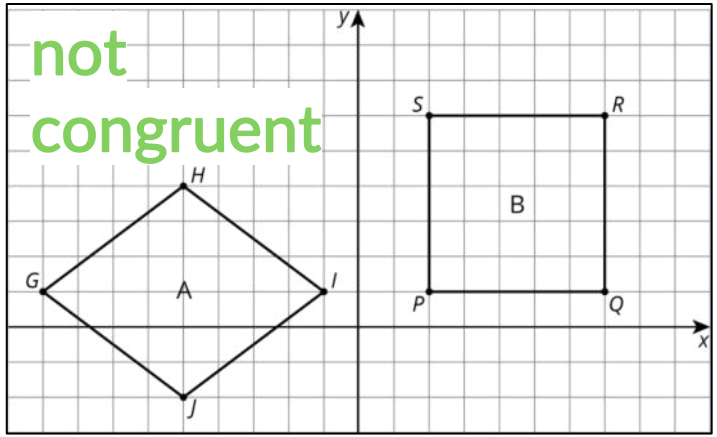

not congruent



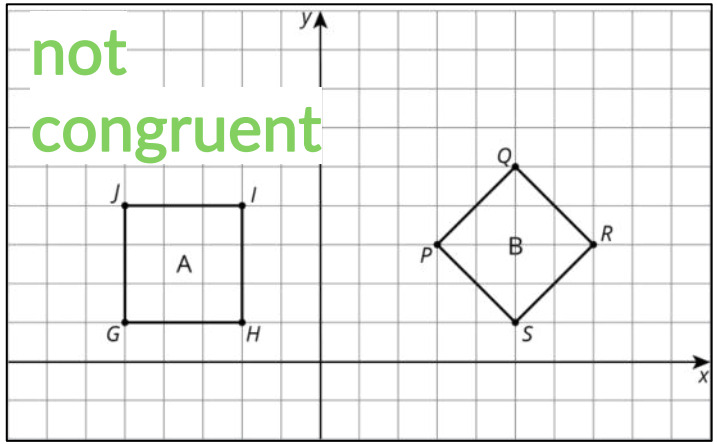

congruent




not congruent

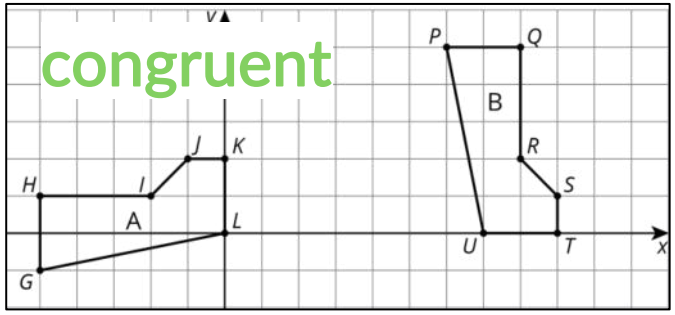


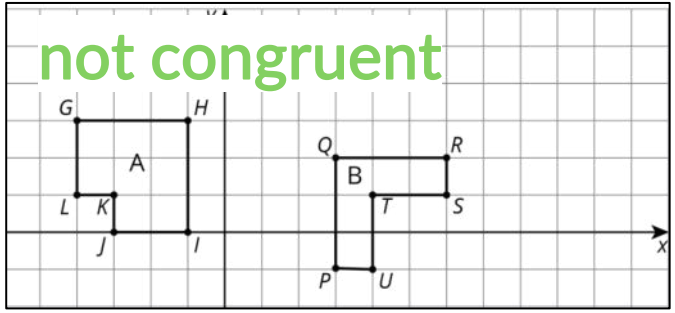

not congruent

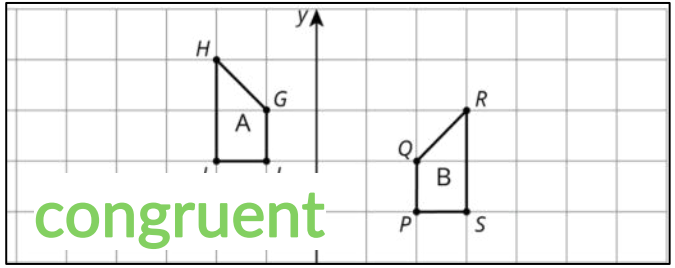


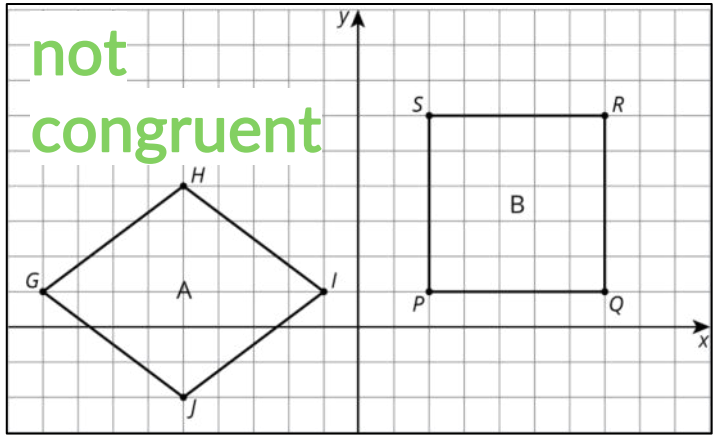
For which shapes was it easiest to give directions to your partner?

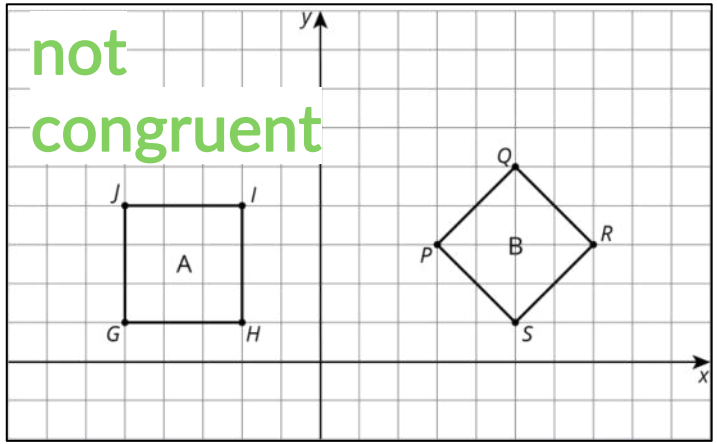
Were some transformations harder to describe than others?



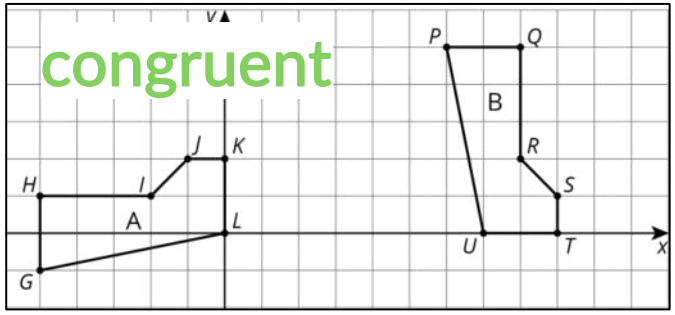



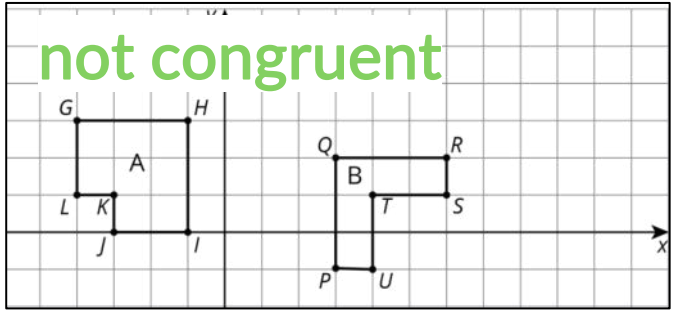



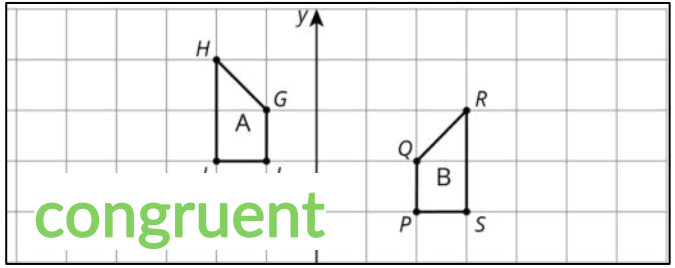



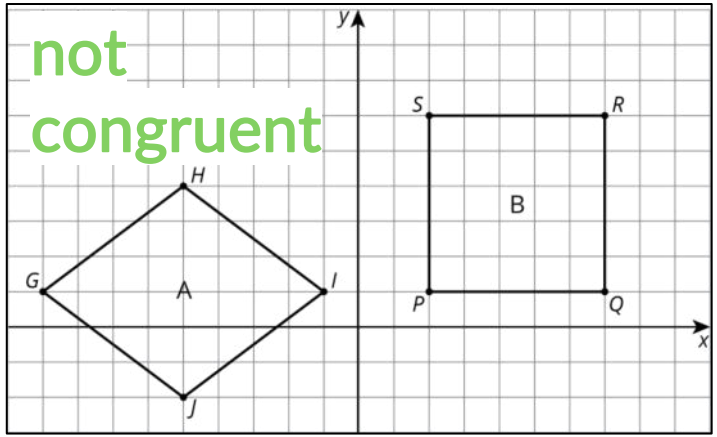
For the pairs of shapes that were *not* congruent, how did you convince your partner?

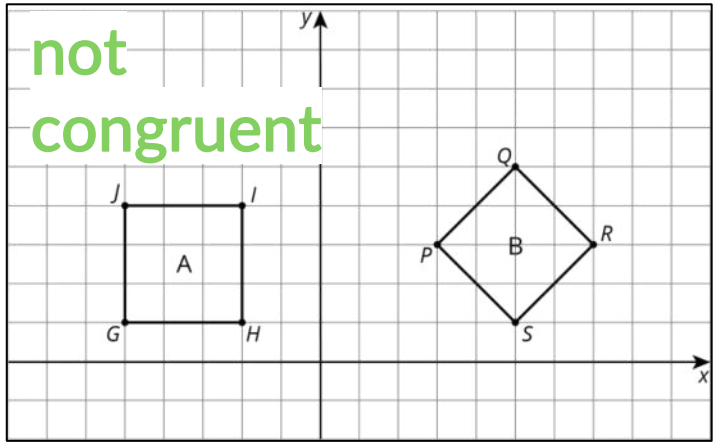
Did you use transformations or did you focus on some distinguishing features of the shapes?



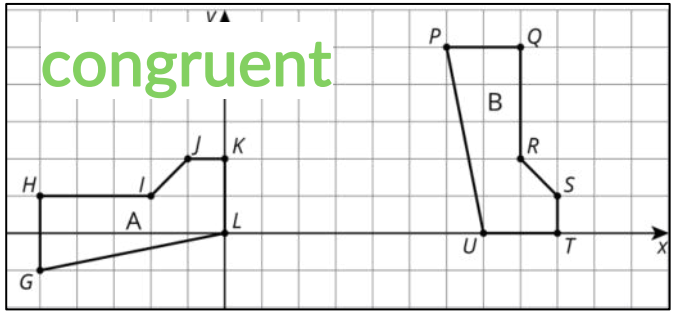



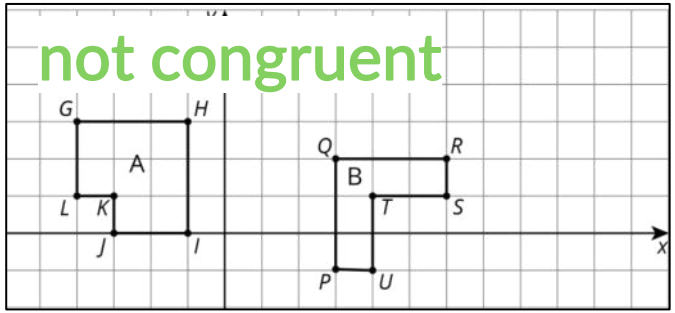



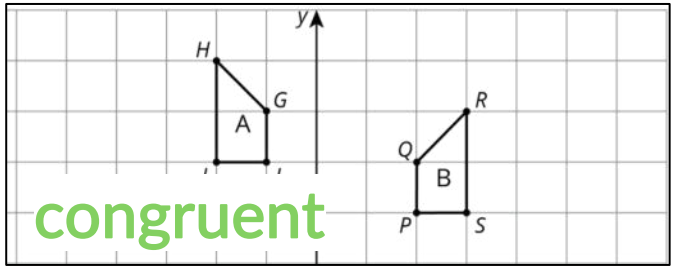



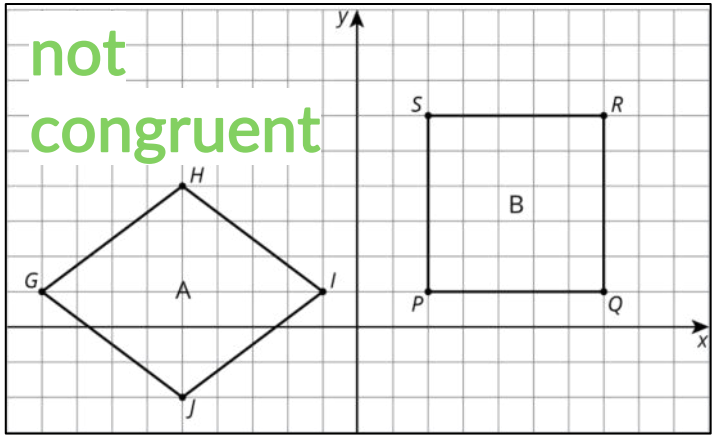



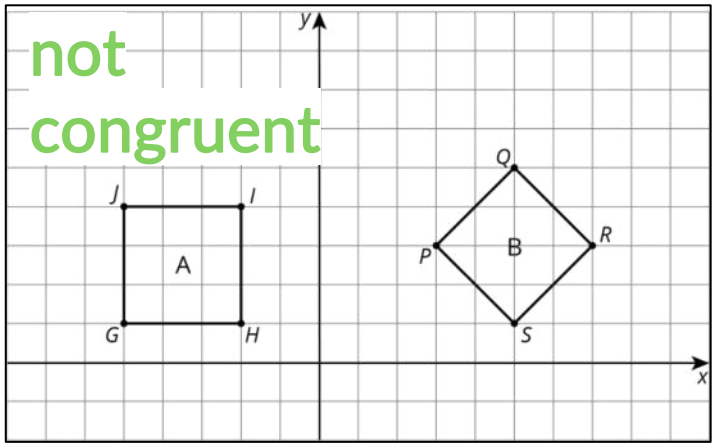
Did you use any measurements (length, area, angle measures) to help decide whether or not the pairs of shapes are congruent?



# “Are you ready for more?”

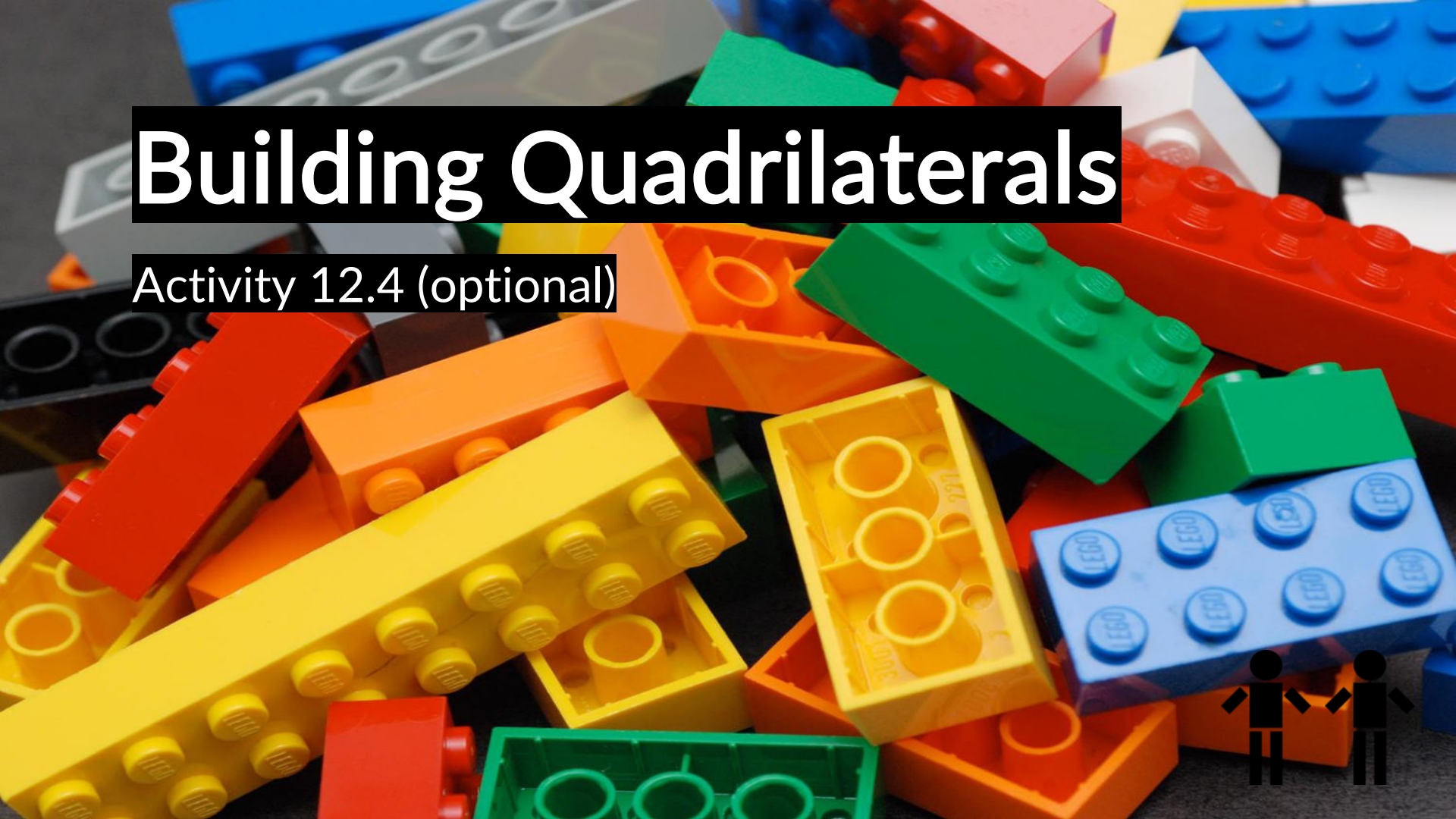
A polygon has 8 sides: five of length 1, two of length 2, and one of length 3. All sides lie on grid lines.

(It may be helpful to use graph paper when working on this problem.)

1. Find a polygon with these properties.
2. Is there a second polygon, not congruent to your first, with these properties?

# Building Quadrilaterals

Activity 12.4 (optional)



Your teacher will give you a set of four objects.

1. Make a quadrilateral with your four objects and record what you have made.
2. Compare your quadrilateral with your partner's. Are they congruent? Explain how you know.
3. Repeat steps 1 and 2, forming different quadrilaterals. If your first quadrilaterals were not congruent, can you build a pair that is? If your first quadrilaterals were congruent, can you build a pair that is not? Explain.

Were the quadrilaterals that you built always congruent?

How did you check?

Was it *possible* to build congruent quadrilaterals?

What parts were important to be careful about when building them?

# Congruent polygons need to have:

- ★ congruent sides
- ★ congruent angles
- ★ congruent sides and angles correspond in both figures

# BIG IDEA #1

Two figures are **congruent** when there is a sequence of translations, rotations, and reflections that match one figure up perfectly with the other.

# BIG IDEA #2

When showing that two figures are **congruent** on a grid,

we use the structure of the grid to describe each rigid motion.

# BIG IDEA #3

Two figures are ***not*** **congruent** if they have different side lengths, different angles, or different areas.

# BIG IDEA #4

Even if two figures have the same side lengths, they may not be congruent.

Example: With 4 sides of the same length, we can make many different rhombuses that are not congruent to another because the angles are different.

# Today's Goals

- ❏ I can decide using rigid transformations whether or not two figures are **congruent**.

# Moving to Congruence

## Cool Down 12.5