IM 9–12 MATH v.1

Unit 2
Congruence

GEOMETRY

Lesson 10

Practicing Proofs

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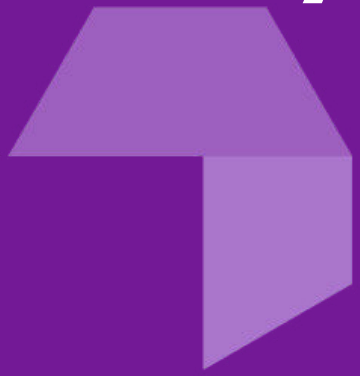
Learning Goal

Let's practice what we've learned about proofs and congruence.

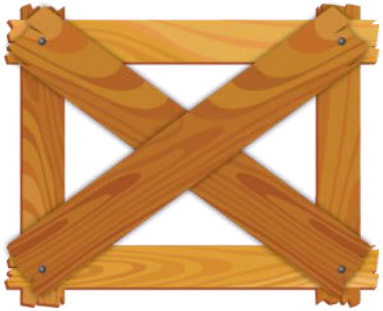
Geometry

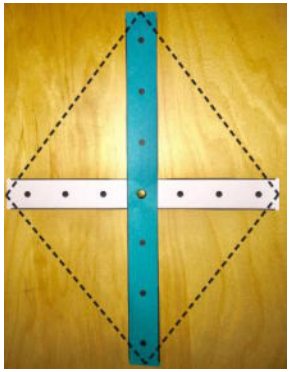


Brace Yourself!

Warm-up

When carpenters want to ensure that something they are building that is supposed to be rectangular doesn't slant, sometimes they use diagonal braces, which are pieces of wood or metal that go from opposite corners of the rectangle.





What can you do with the braces and fasteners your teacher will give you?

What different ways can you arrange them?

What different quadrilaterals can you make by changing the braces?

Keep track of your findings.

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Card Sort: More Practice Seeing Shortcuts

1. Your teacher will give you a set of cards that show different structures. Sort the cards into 2 categories of your choosing. Be prepared to explain the meaning of your categories. Then, sort the cards into 2 categories in a different way. Be prepared to explain the meaning of your new categories.
2. Sort the cards by rigid vs. flexible structures.
3. State at least one set of triangles that can be proved congruent using:
    a. Side-Angle-Side Triangle Congruence Theorem
    b. Angle-Side-Angle Triangle Congruence Theorem
    c. Side-Side-Side Triangle Congruence Theorem

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Matching Pictures to Proofs

Take turns with your partner to match a statement with a diagram that could go with that proof. For each match you find, explain to your partner how you know it's a match. For each match your partner finds, listen carefully to their explanation. If you disagree, discuss your thinking and work to reach an agreement.

1. A quadrilateral with perpendicular diagonals that bisect each other is equilateral.
2. If one diagonal of a quadrilateral is the perpendicular bisector of the other, then 2 pairs of adjacent sides are congruent.
3. Opposite angles in an equilateral quadrilateral are congruent.
4. In a parallelogram, opposite sides are congruent.

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Practicing Proofs

Lesson Synthesis

Make a conjecture about what must be true about an equilateral quadrilateral.

Make an equilateral quadrilateral with the shorter strips. Do you want to refine any of your conjectures based on your exploration with the strips?

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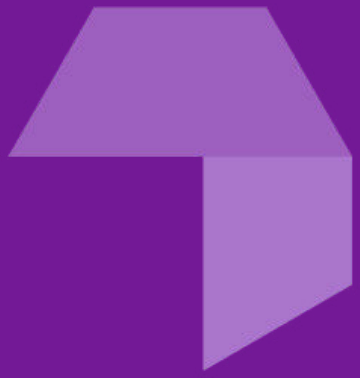
- I can use the Side-Side-Side, Angle-Side-Angle, and Side-Angle-Side Triangle Congruence Theorems in proofs.
- I can write conjectures about quadrilaterals.

Learning Targets

Geometry



Practice Proving

Cool-down

Choose one of the statement and diagram pairs from the matching activity. Write the proof.

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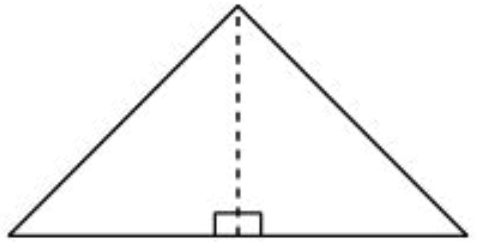
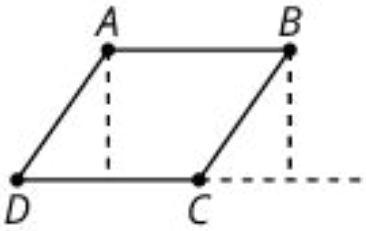
auxiliary line

An extra line drawn in a figure to reveal hidden structure.



For example, the line shown in the isosceles triangle is a line of symmetry, and the lines shown in the parallelogram suggest a way of rearranging it into a rectangle.



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converse

The converse of an if-then statement is the statement that interchanges the hypothesis and the conclusion. For example, the converse of "if it's Tuesday, then this must be Belgium" is "if this is Belgium, then it must be Tuesday."

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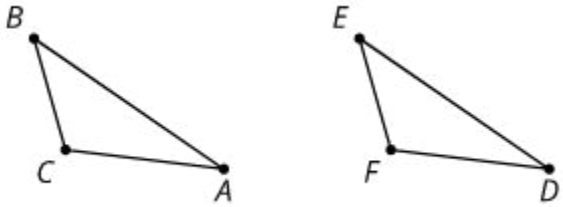
corresponding

For a rigid transformation that takes one figure onto another, a part of the first figure and its image in the second figure are called corresponding parts. We also talk about corresponding parts when we are trying to prove two figures are congruent and set up a correspondence between the parts to see if the parts are congruent.



In the figure, segment *AB* corresponds to segment *DE*, and angle *BCA* corresponds to angle *EFD*.

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parallelogram

A quadrilateral in which pairs of opposite sides are parallel.

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