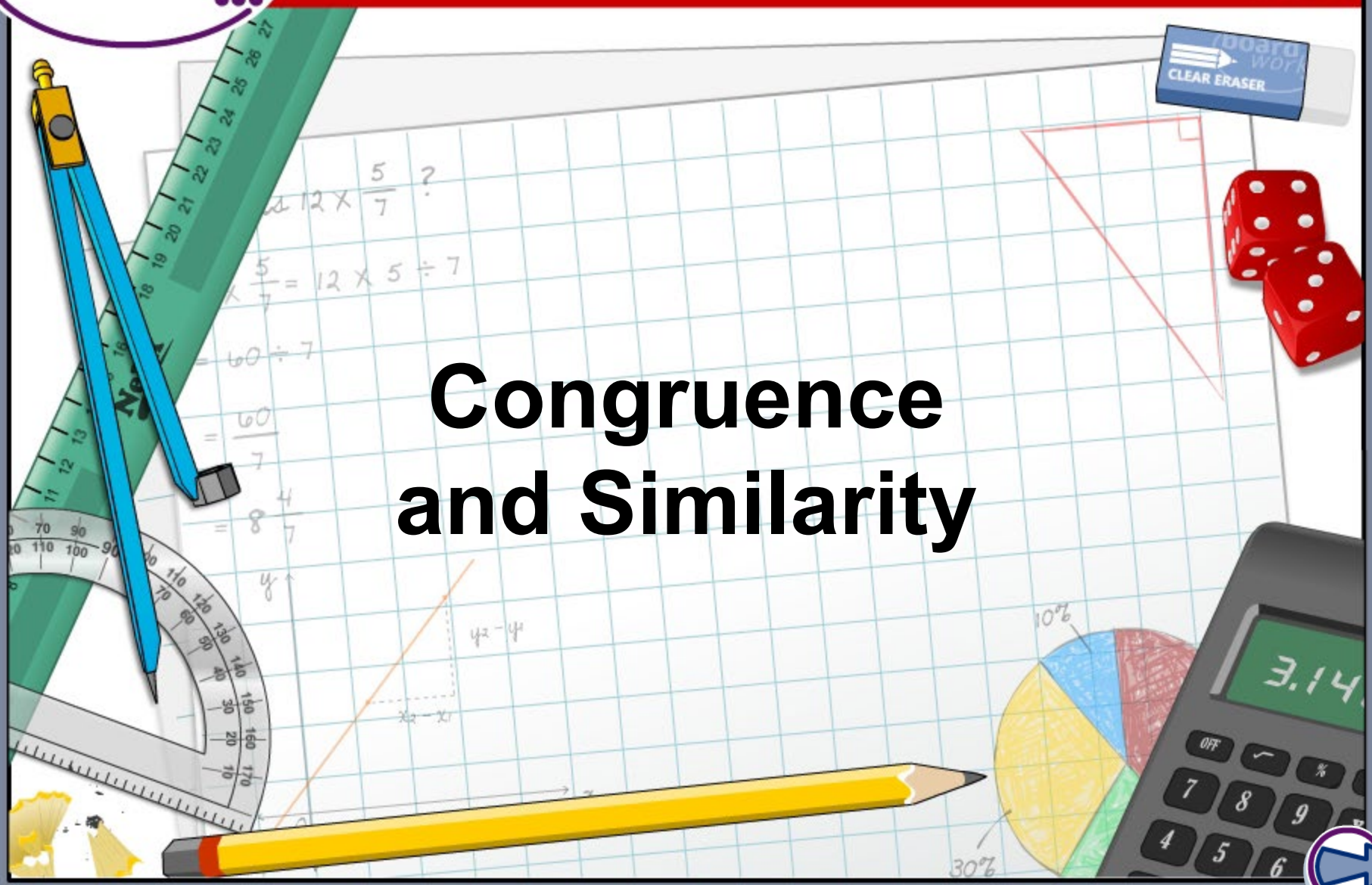


Congruence and Similarity

Information

Common core icons

This icon indicates a slide where the Standards for Mathematical Practice are being developed. Details of these are given in the Notes field.

Slides containing examples of mathematical modeling are marked with this stamp.

This icon indicates an opportunity for discussion or group work.

The **Standards for Mathematical Practice** outlined in the Common Core State Standards for Mathematics describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

These are:

1) Make sense of problems and persevere in solving them.

2) Reason abstractly and quantitatively.

3) Construct viable arguments and critique the reasoning of others.

4) Model with mathematics.

5) Use appropriate tools strategically.

6) Attend to precision.

7) Look for and make use of structure.

8) Look for and express regularity in repeated reasoning.

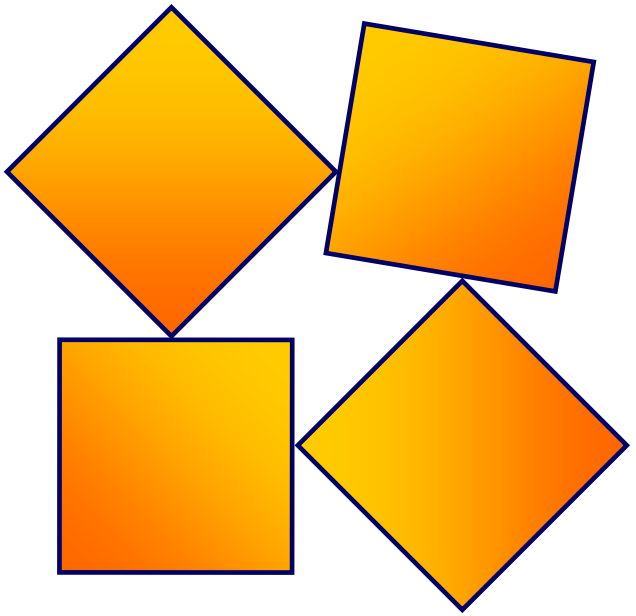
This icon indicates that the slide contains activities created in Flash. These activities are not editable.

This icon indicates teacher's notes in the Notes field.

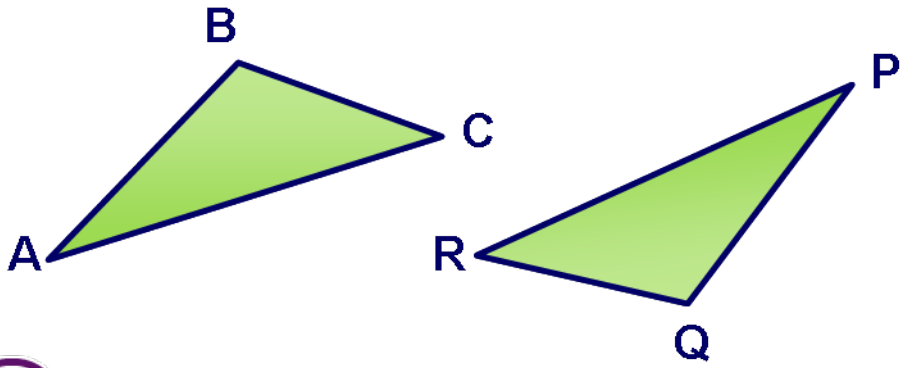
Congruent shapes

Objects with exactly the same shape and size are **congruent**.

If two shapes are congruent, their corresponding lengths and angles are **the same**.



Are triangles ABC and PQR congruent?



AB = PQ, BC = QR, and AC = PR.

∠A = ∠P, ∠B = ∠Q, and ∠C = ∠R.

Transformations review

Match each term to its definition

trans

rota

dila

reflection

A **transformation** is a change in an object's position or size.

Press **start** to review some common transformations.

start

changes the size of an object

Exploring transformations

Which transformations make congruent shapes?

rota

refle

trans

dila

Which transformations produce congruent shapes? Remember, only objects with exactly the same shape and size are congruent.

Press **start** to begin.

start

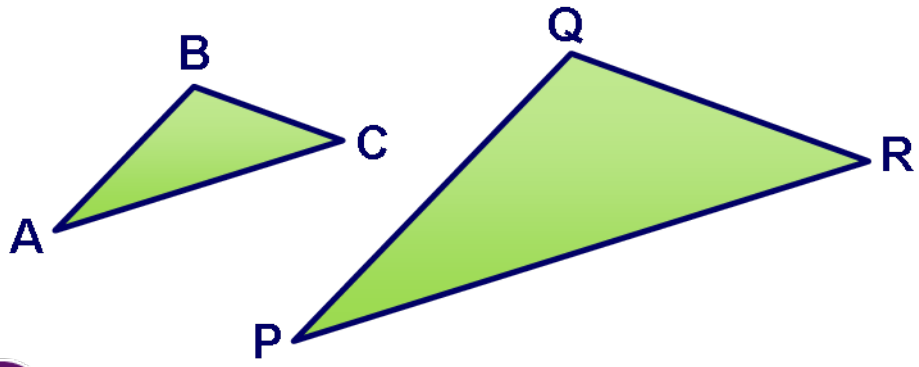
Similar shapes

If an image is produced by **dilation** of a pre-image, the two shapes are **not** congruent. Instead, we say they are **similar**.

Similar shapes have the same angle sizes but **different** side lengths.

The corresponding side lengths of two similar shapes are always in the same ratio.

Are triangles ABC and PQR similar?

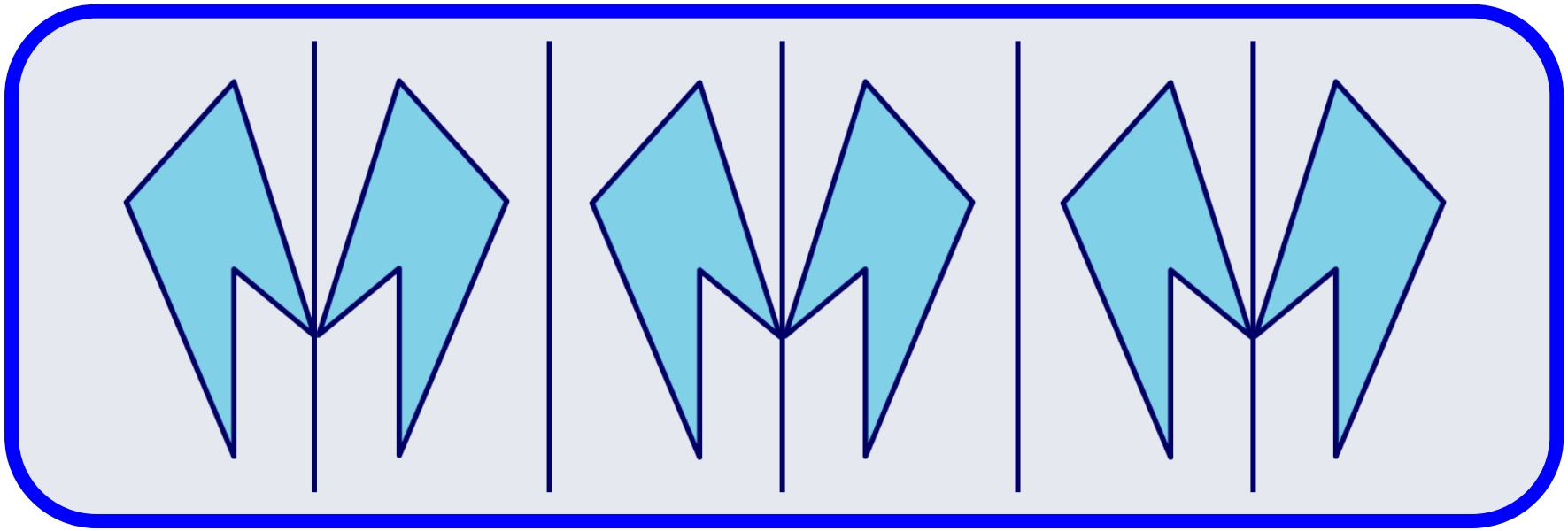


$\angle A = \angle P$, $\angle B = \angle Q$, and $\angle C = \angle R$.

$AB:PQ = BC:QR = AC:PR$

Parallel mirror lines

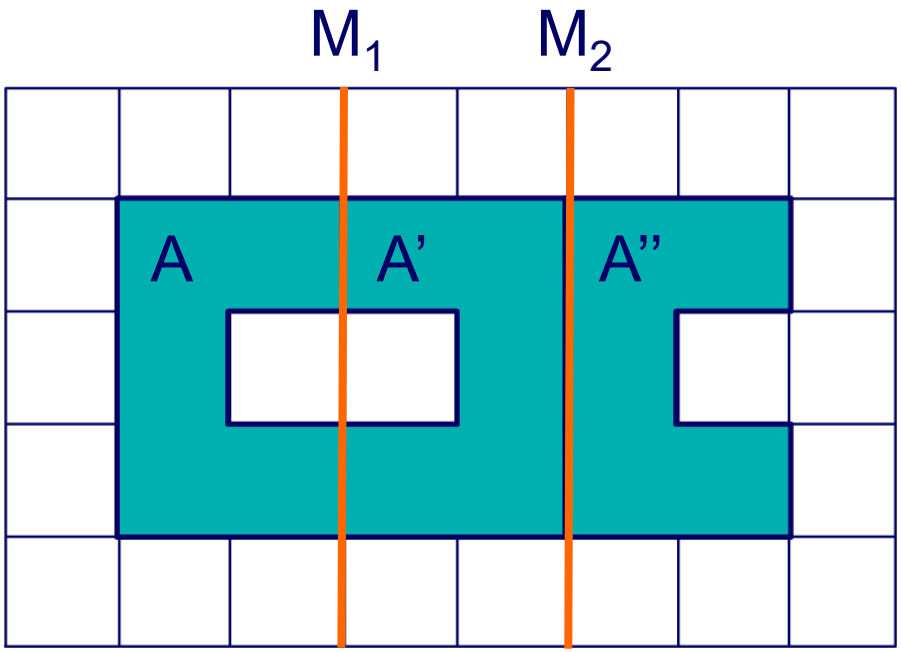
What happens when a figure is reflected in parallel mirror lines placed at equal distances?



Are the resulting images congruent or similar?

Combining transformations

Suppose we have two parallel mirror lines M_1 and M_2.



We can reflect shape *A* in mirror line M_1 to produce the image *A'*.

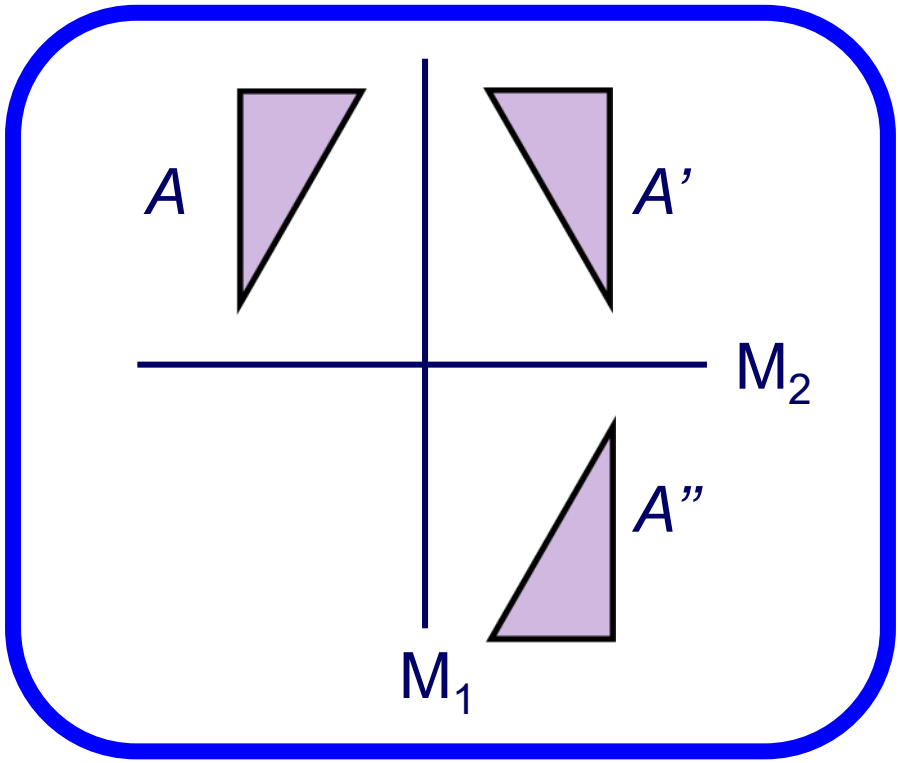
We can then reflect shape *A'* in mirror line M_2 to produce the image *A"*.

How can we map *A* onto *A"* in a single transformation?

Reflecting a figure in two parallel mirror lines is equivalent to a single translation.

Perpendicular mirror lines

Suppose we have two perpendicular mirror lines M1 and M2.



We can reflect shape *A* in mirror line M_1 to produce the image *A'*.

We can then reflect shape *A'* in mirror line M_2 to produce the image *A"*.

How can we map *A* onto *A"* in a single transformation?

Reflection in two perpendicular lines is equivalent to a single rotation of 180°.

Transformation shape sorter