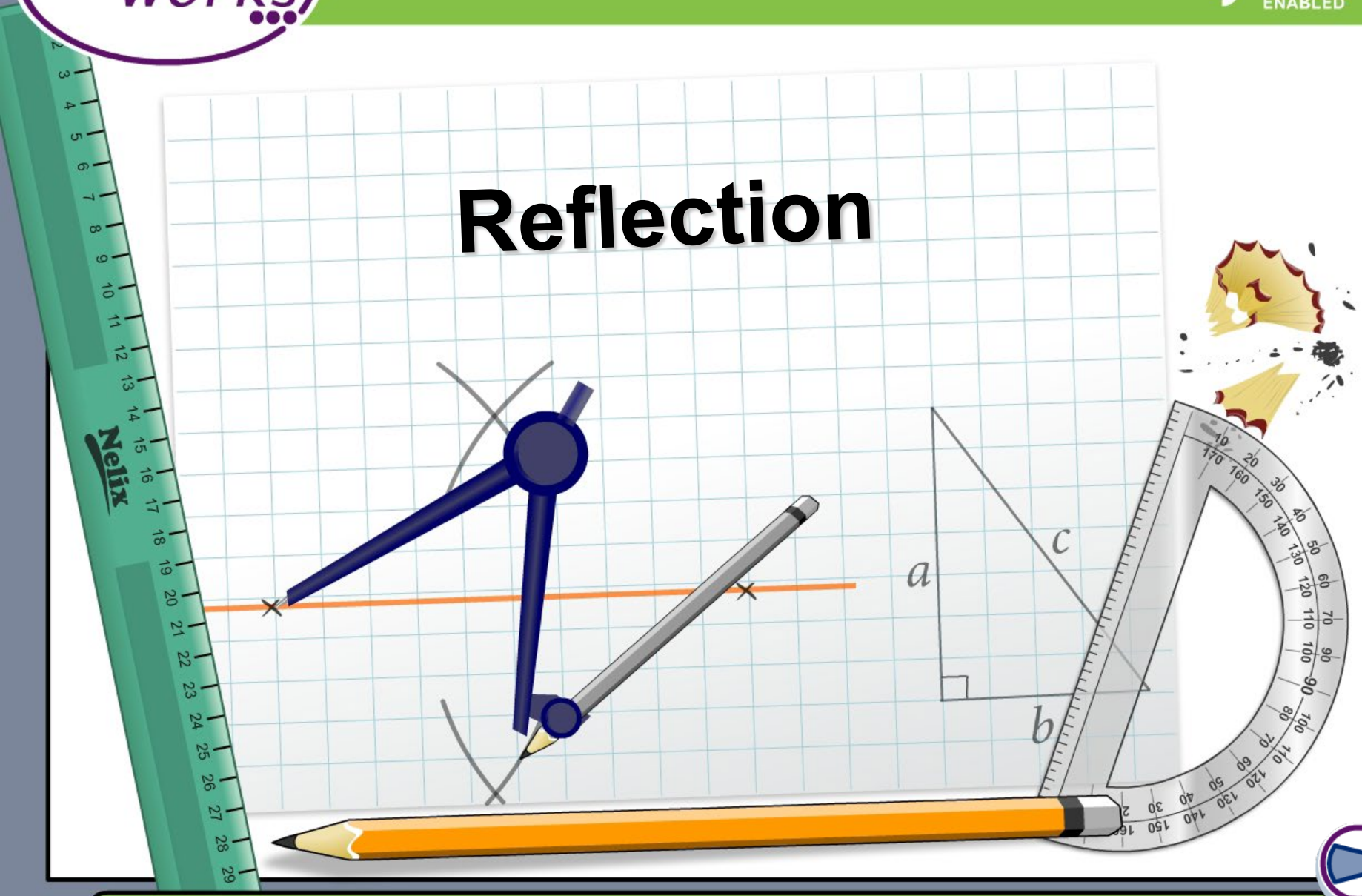
Reflection



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.

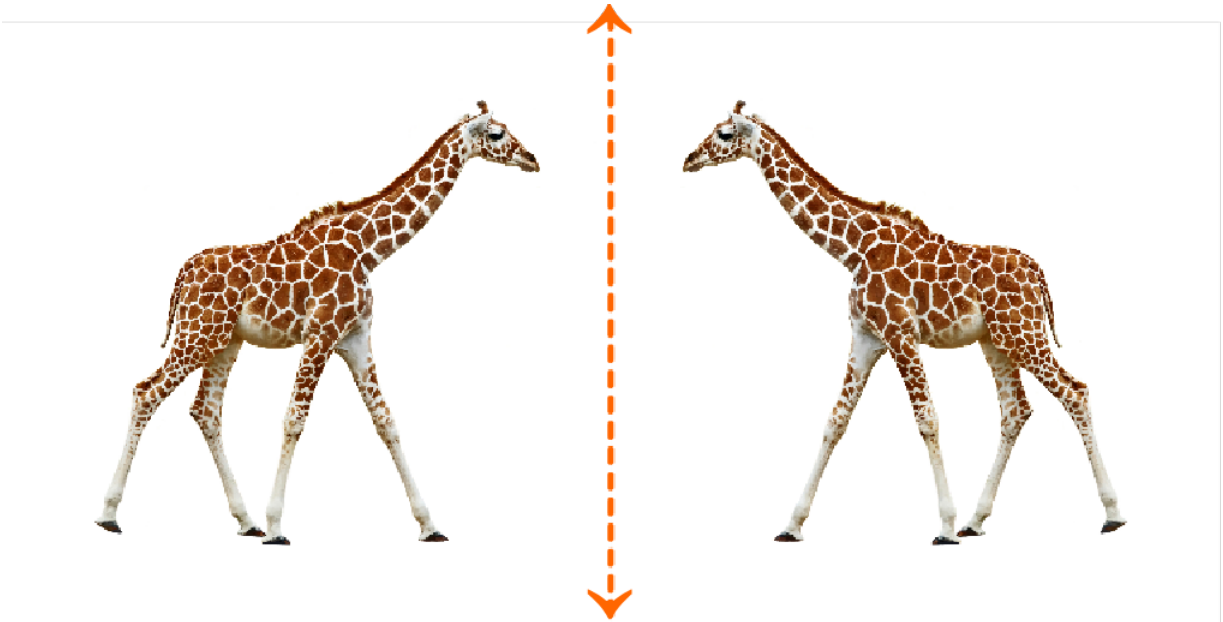
8) Look for and express regularity in repeated reasoning.

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.

Reflection

An object can be **reflected** across a **line of reflection** to produce an image of the object.

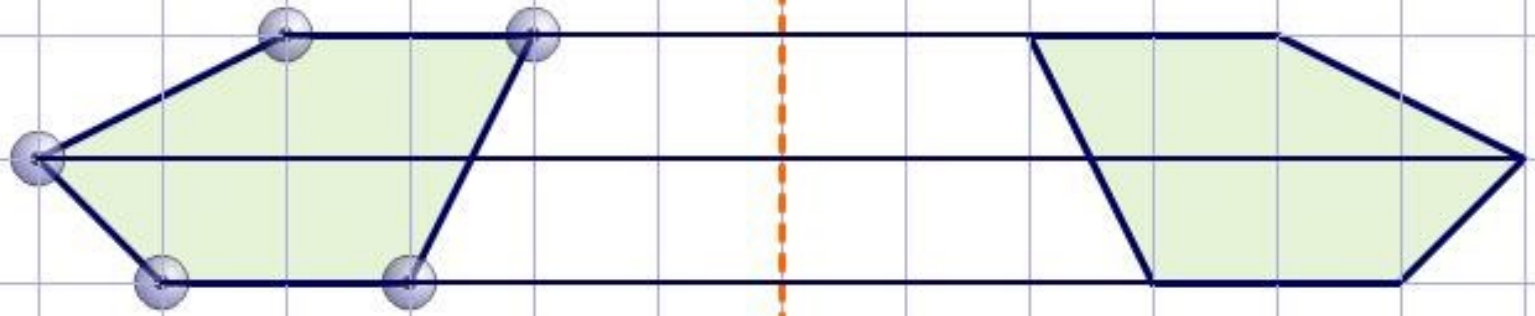


line of reflection

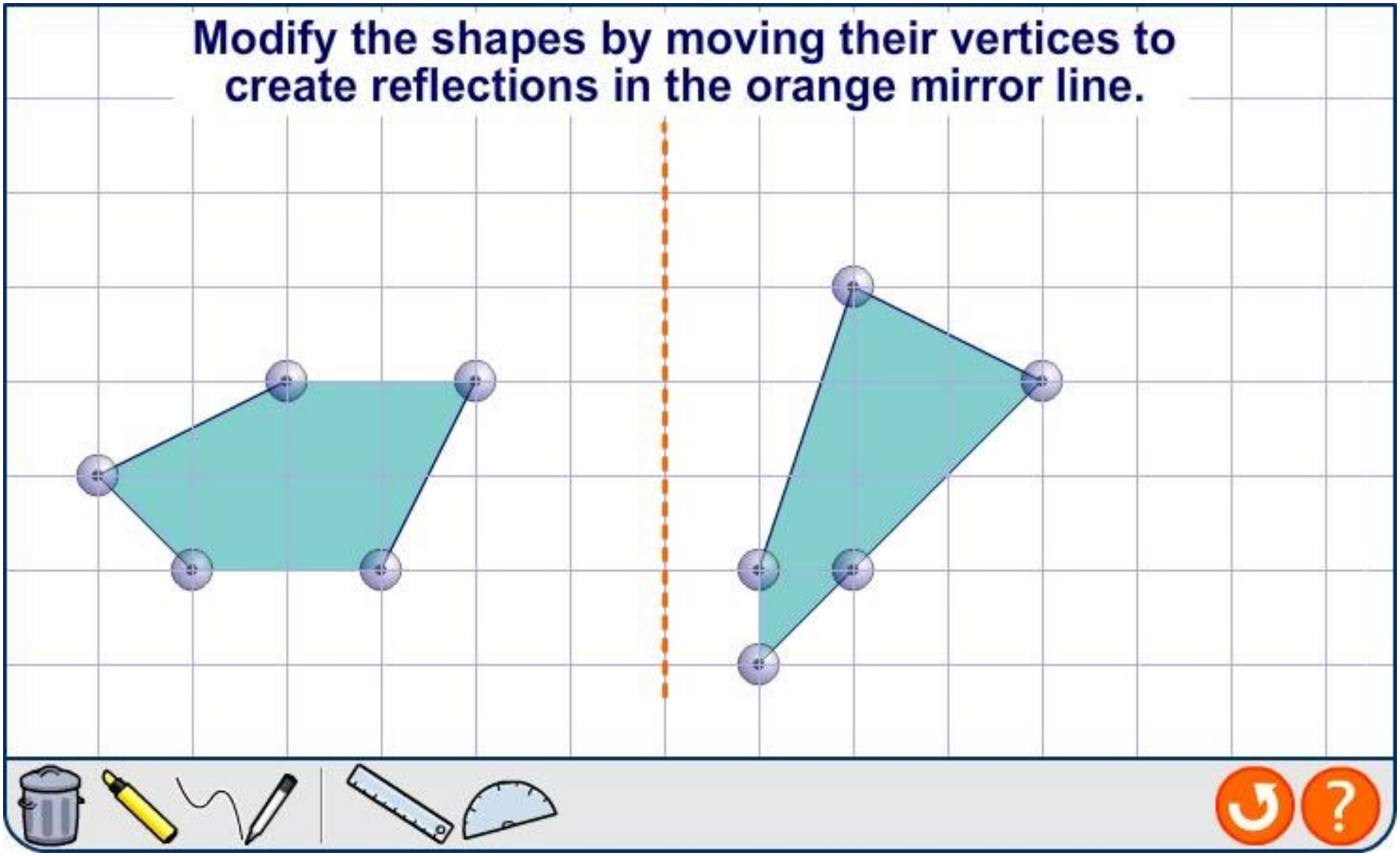
Each point in the image is the same distance from the line of reflection as the corresponding point of the original object.

Reflection

Change the shape to see how its reflection changes across the mirror line.

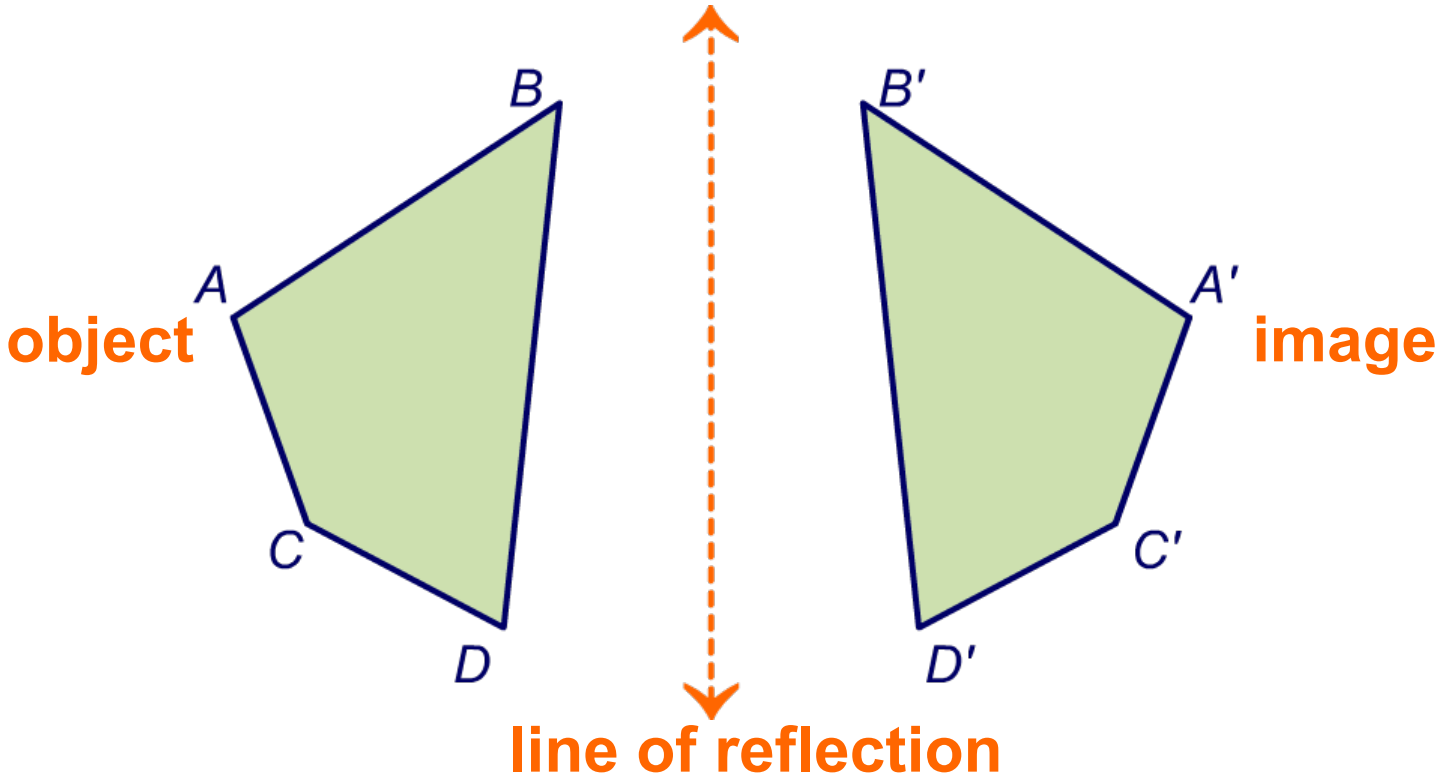


Created reflections



Reflecting shapes

If we reflect the quadrilateral $ABCD$ across the line of reflection, we label the image quadrilateral $A'B'C'D'$.

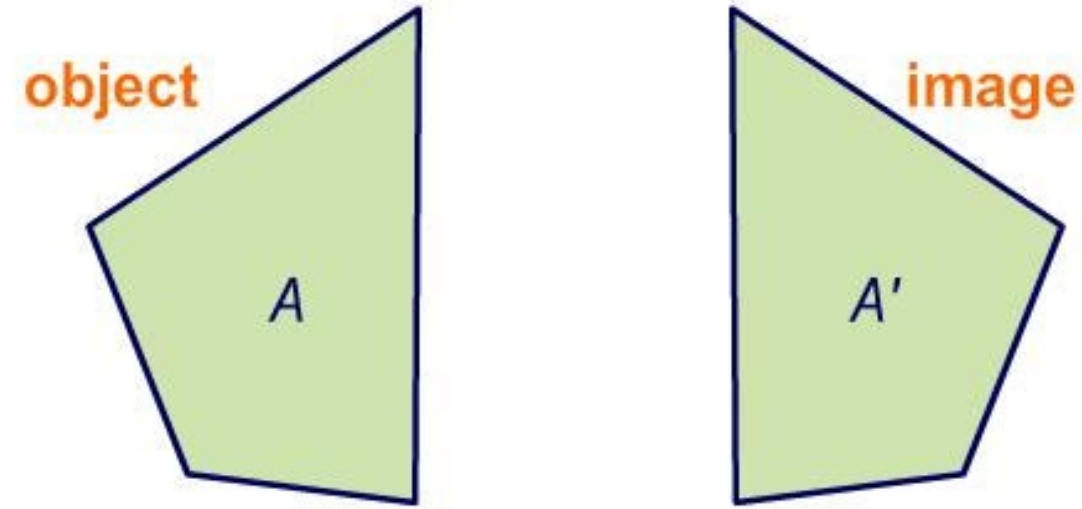


The image is **congruent** to the original shape.

The line of reflection

The line of reflection is equidistant from both the object and its image.

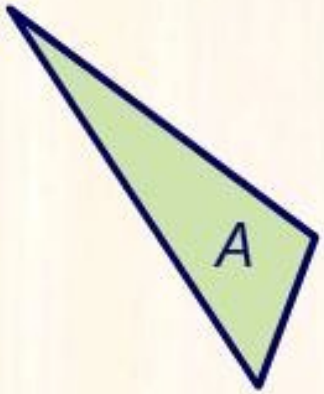
Press **play** to see.



Finding the line of reflection

The line of reflection can be found for any object and its image.

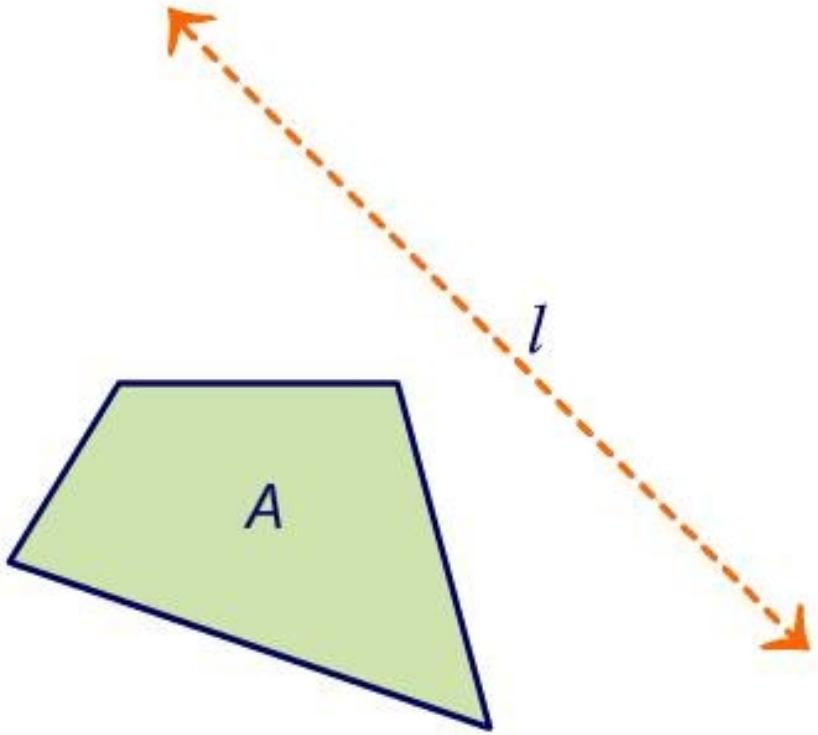
Press **play** to see how to construct the line of reflection.



Drawing a reflection

An object can be reflected over a line of reflection to create an image.

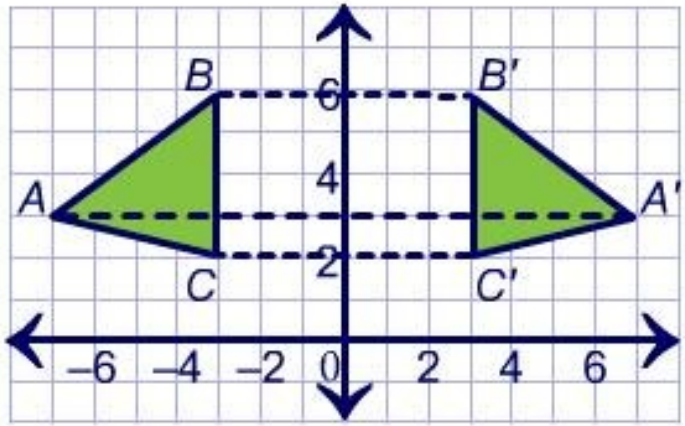
Press **play** to see how to construct a reflection.



Prove congruence

Use the Pythagorean Theorem and the side-side-side postulate to prove that $\triangle ABC \cong \triangle A'B'C'$.

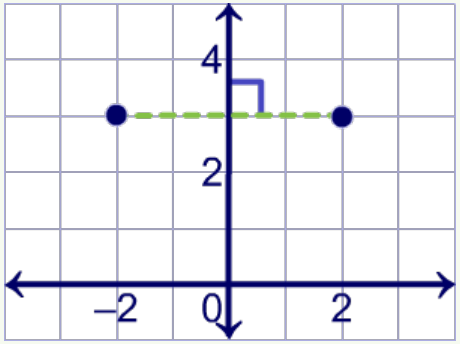
Press the "=" button to show the calculations step-by-step.



Reflection in the coordinate plane

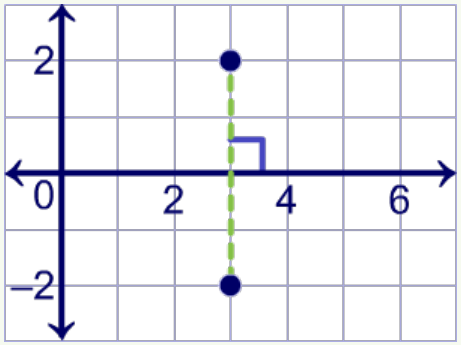
Points can be reflected on a coordinate plane.

reflection across the y-axis



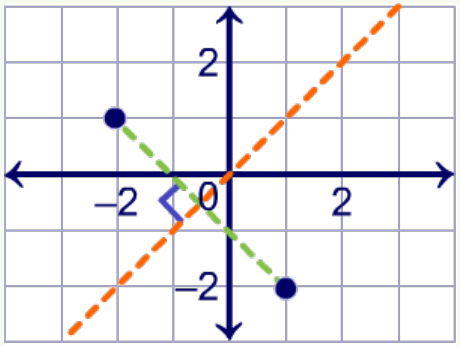
$(x, y) \rightarrow (-x, y)$

reflection across the x-axis



$(x, y) \rightarrow (x, -y)$

reflection across the $y = x$

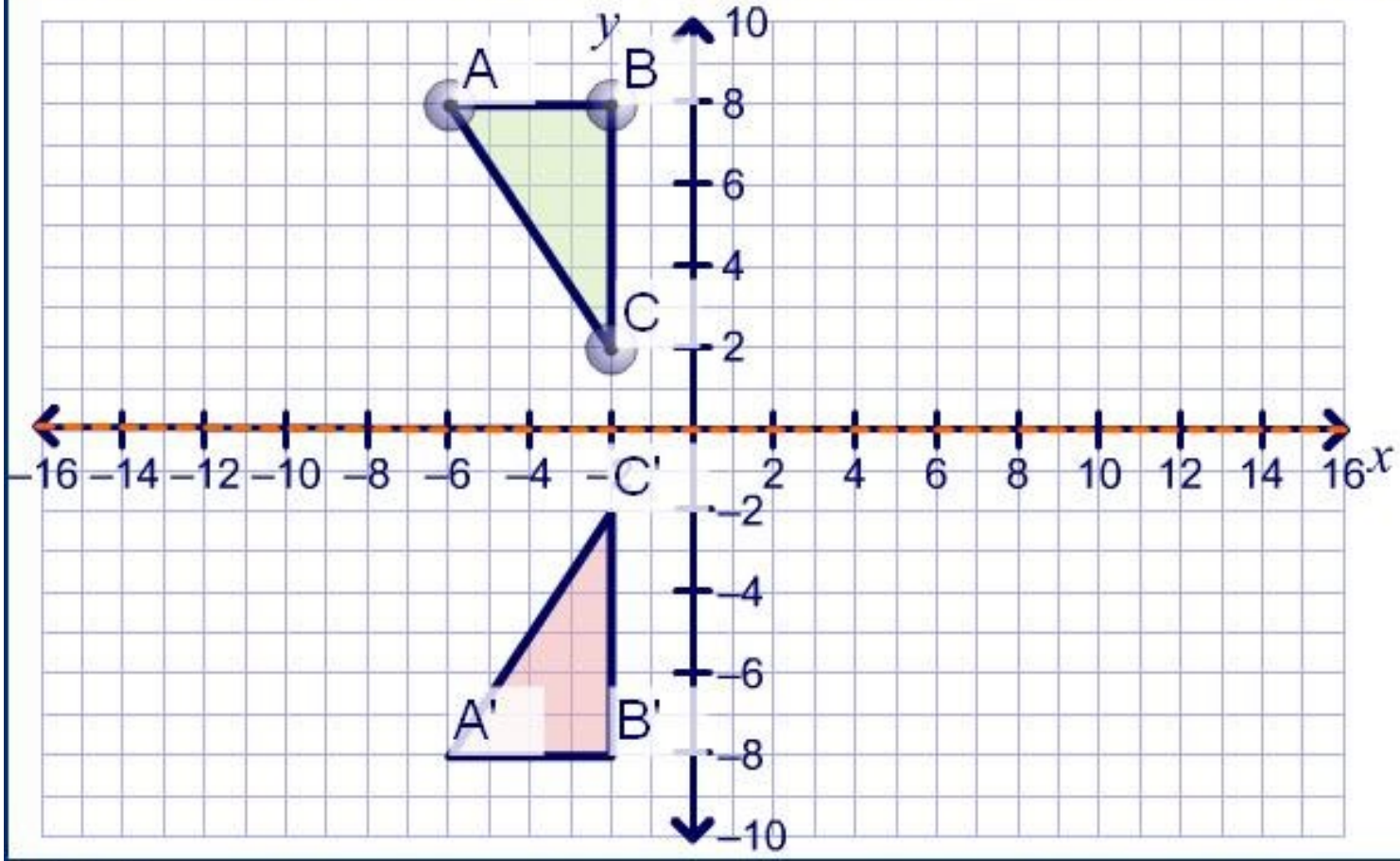


$(x, y) \rightarrow (y, x)$

The line connecting a point to its reflection is always perpendicular to the line of reflection.

Reflection in the coordinate plane

Select a line of reflection. Drag the points to see how the triangle is reflected.



$y = 0$

$x = 0$

$y = x$

$y = -x$

Reflecting patterns

A tile setter is tiling a kitchen floor. He has one quadrant complete but needs to recreate the pattern in the other three quadrants. He wants to reflect the pattern over the y-axis, then the x-axis, and over the y-axis again to complete the floor.

The center of a red square is located at (–7, 7). Where will this square be located in each of the other quadrants?

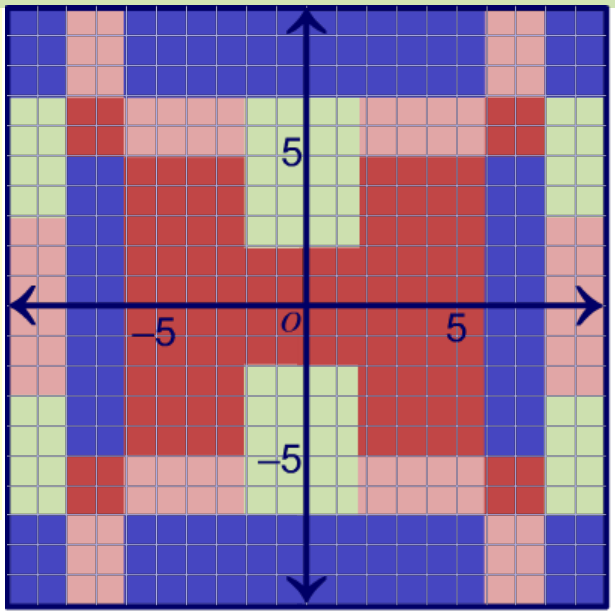
Reflect tiles over: y-axis

x-axis

y-axis

Find coordinates of the red square in the other quadrants:

(–7, –7), (7, 7), (7, –7)



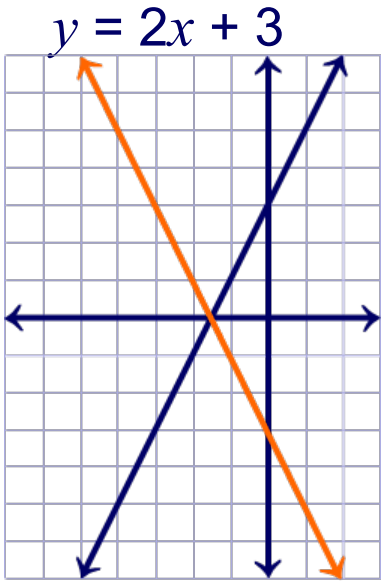
Reflection of a function

Given: $y = g(x) = 2x + 3$. Reflect the graph over the x-axis. Find the equation of the new graph, $g'(x)$.

reflections across the x-axis,
$(x, y) \rightarrow (x, -y)$: $g'(x) = -f(x)$

substitute for $f(x)$: $g'(x) = -(2x + 3)$

distribute: $g'(x) = -2x - 3$ ✓

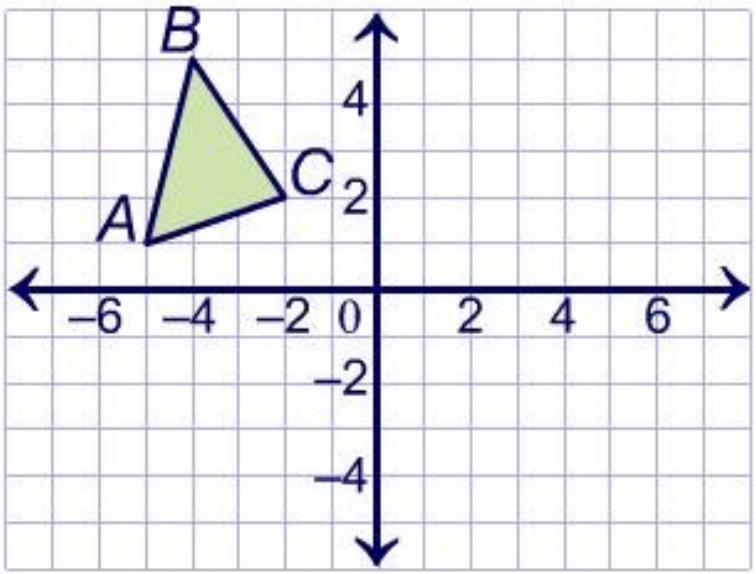


reflection of a function across the x-axis:
$$y = -g(x)$$
reflection of a function across the y-axis:
$$y = g(-x)$$

Reflections summary

Question: 1/5

Reflect triangle ABC across the x-axis. What are the new coordinates of its vertices?



A'	(,)
B'	(,)
C'	(,)

type the answer in the boxes above