

Chapter 4

Transformations



4.1 - Translations

4.2 - Reflections

4.3 - Rotations

4.4 - Congruence and Transformations

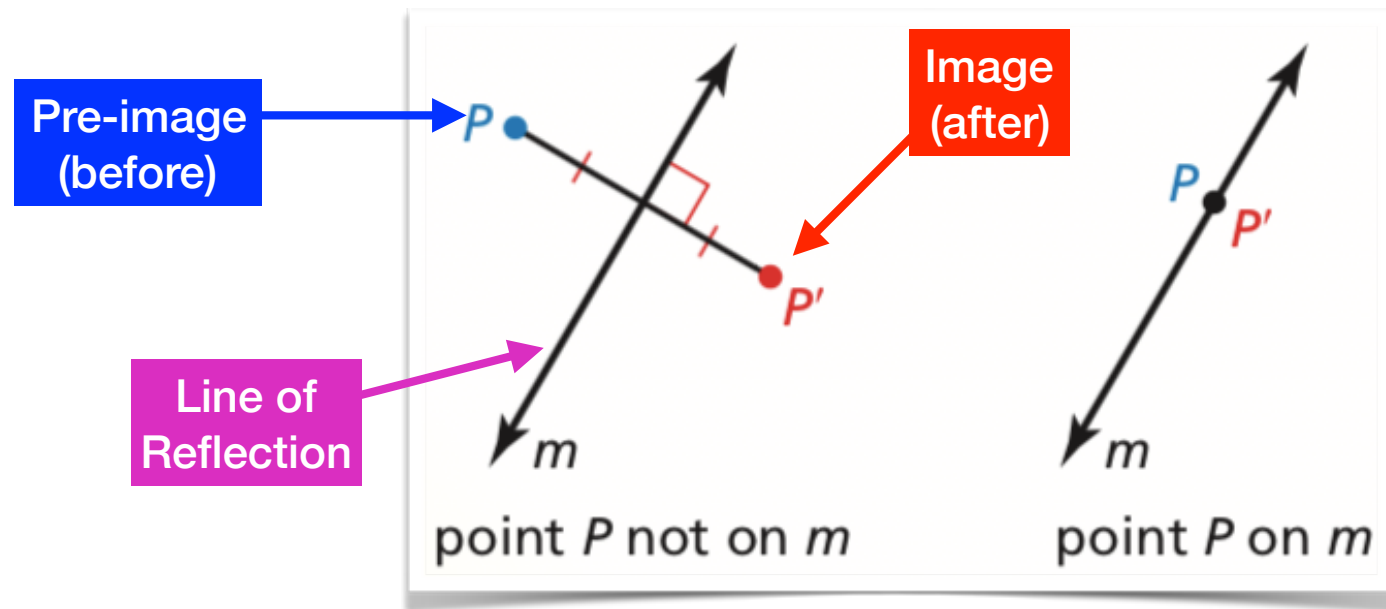
4.5 - Dilations

4.6 - Similarity and Transformations

4.2 - Reflections

Vocabulary

Reflection	a transformation that uses a line like a mirror to reflect a figure
Line of Reflection	the mirror line

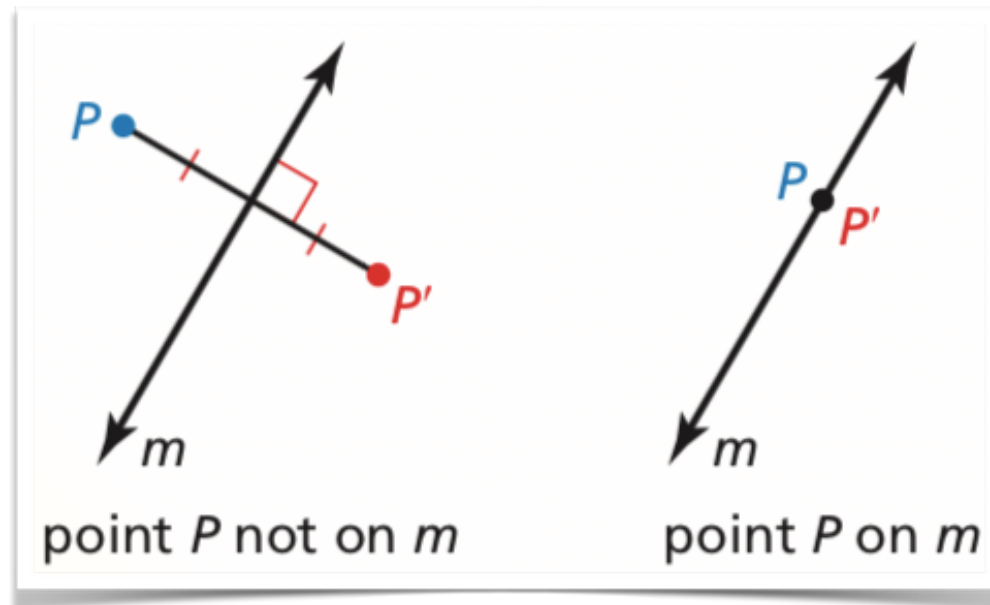


4.2 - Reflections

Definition:

A reflection in a line m maps every point P in the plane to a point P' , so that for each point one of the following properties is true.

- If P is not on m , then m is the perpendicular bisector of $\overline{PP'}$, or
- If P is on m , then $P = P'$.

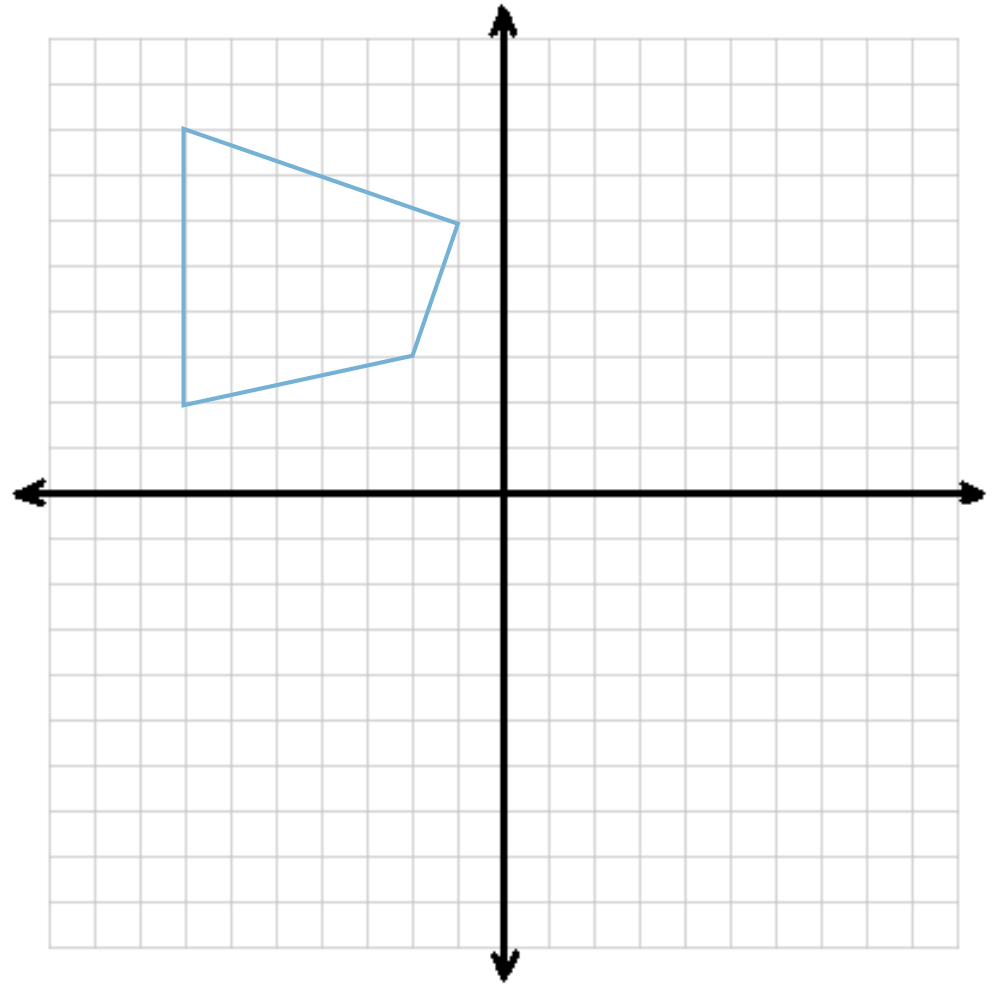


4.2 - Reflections

Graph:

Reflect the pre-image about the:

- a) x-axis
- b) y-axis



4.2 - Reflections

Graph:

Pre-image: $A(1, 3)$, $B(5, 2)$, $C(2, 1)$

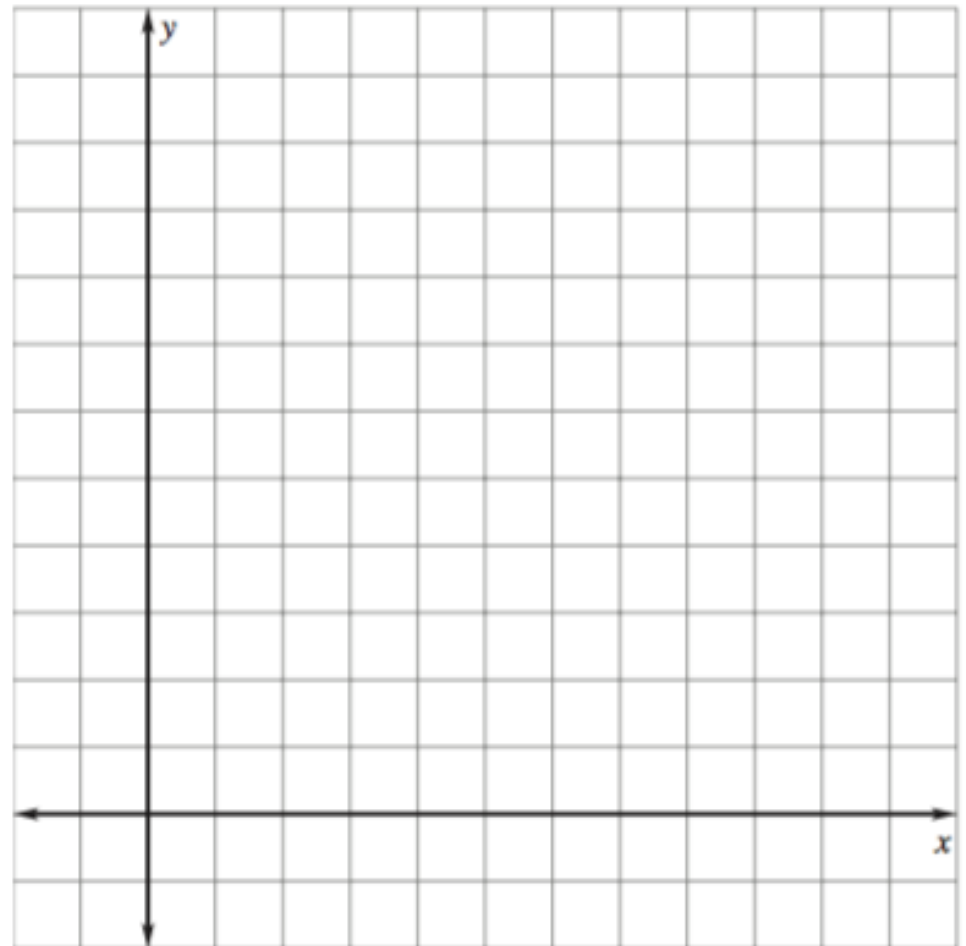
Reflect about the line:

(a) $x = 5$

(b) $y = 4$

Challenge:

make a rule for (a)

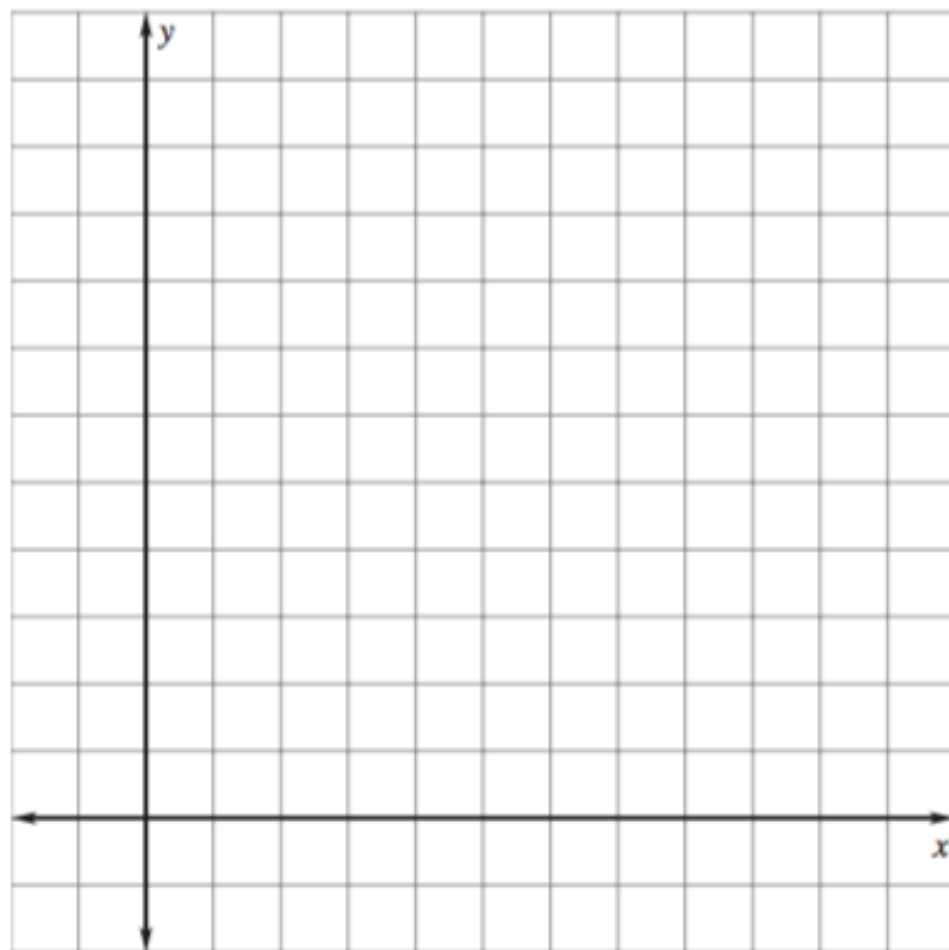


4.2 - Reflections

Graph:

Pre-image: $A(1, 3)$, $B(5, 2)$, $C(2, 1)$

Reflect about the line: $y = x$



4.2 - Reflections

Rules of Reflection

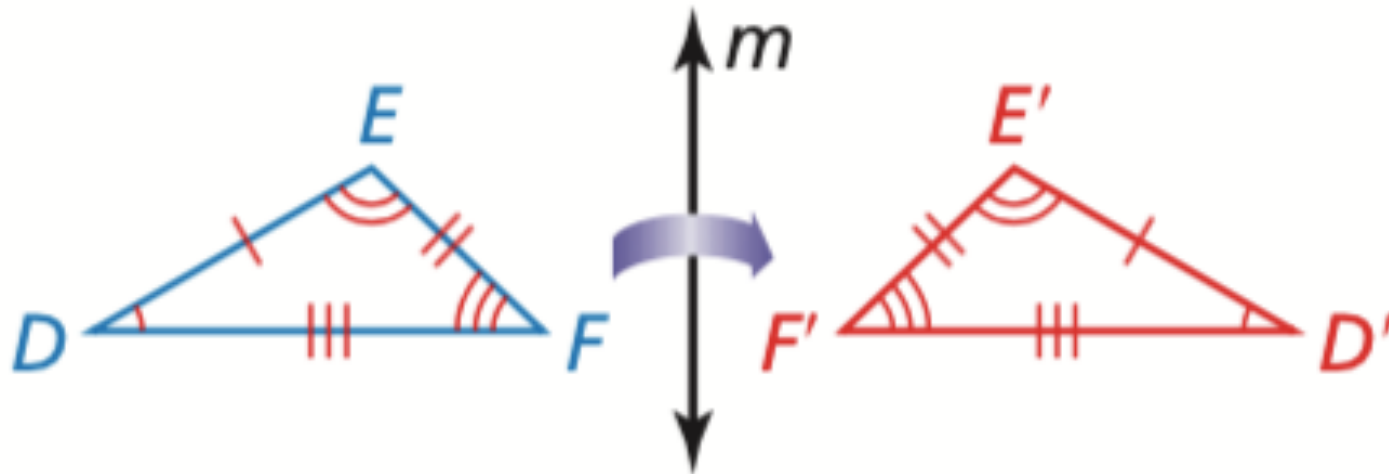
Line of Reflection	Rule
across the x-axis	$(a, b) \rightarrow (a, -b)$
across the y-axis	$(a, b) \rightarrow (-a, b)$
across the line $y = x$	$(a, b) \rightarrow (b, a)$
across the line $y = -x$	$(a, b) \rightarrow (-b, -a)$

4.2 - Reflections

Postulate

Reflection Postulate

A reflection is a rigid motion.
(isometry)

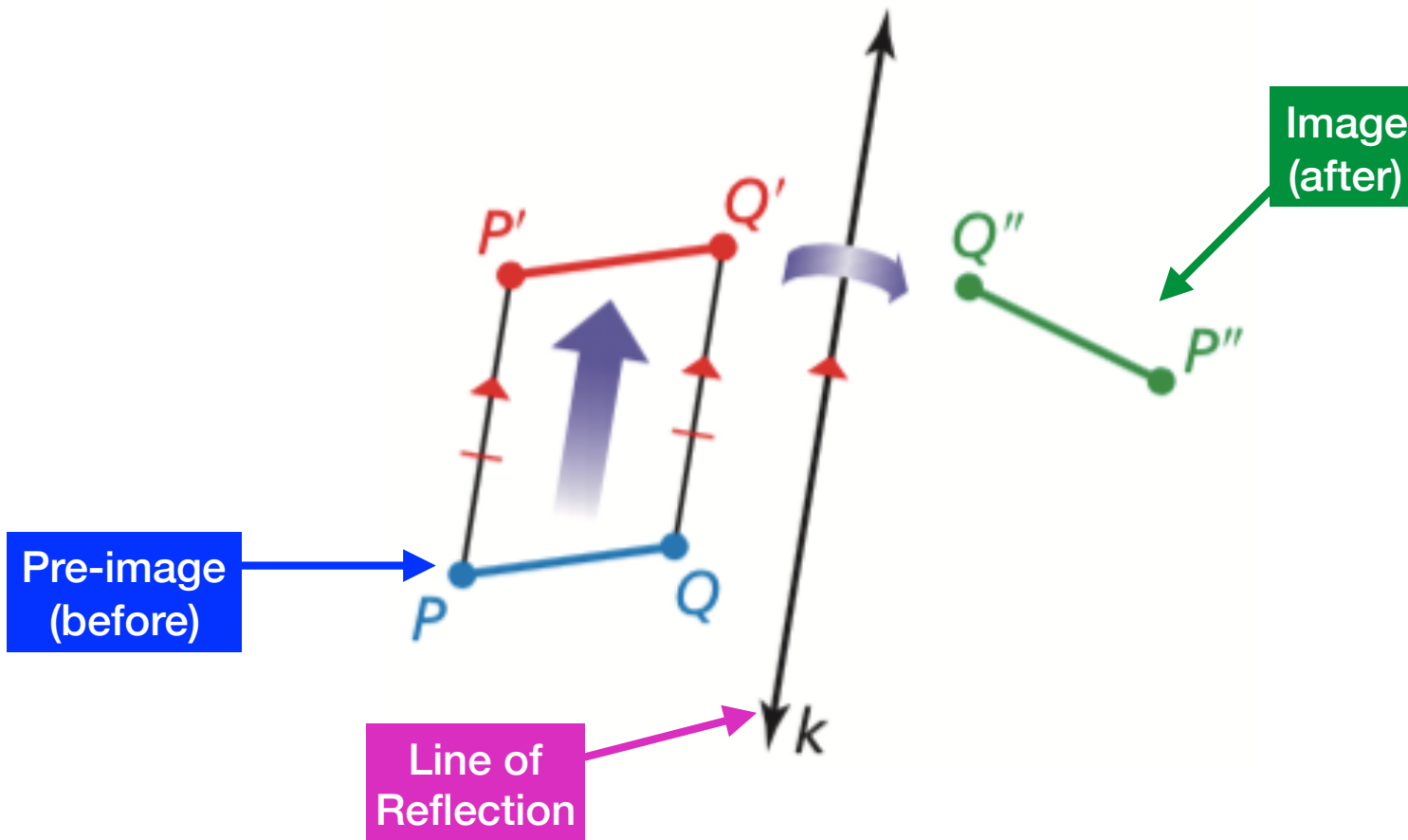


4.2 - Reflections

Vocabulary

Glide Reflection

a transformation involving a translation followed by a reflection



4.2 - Reflections

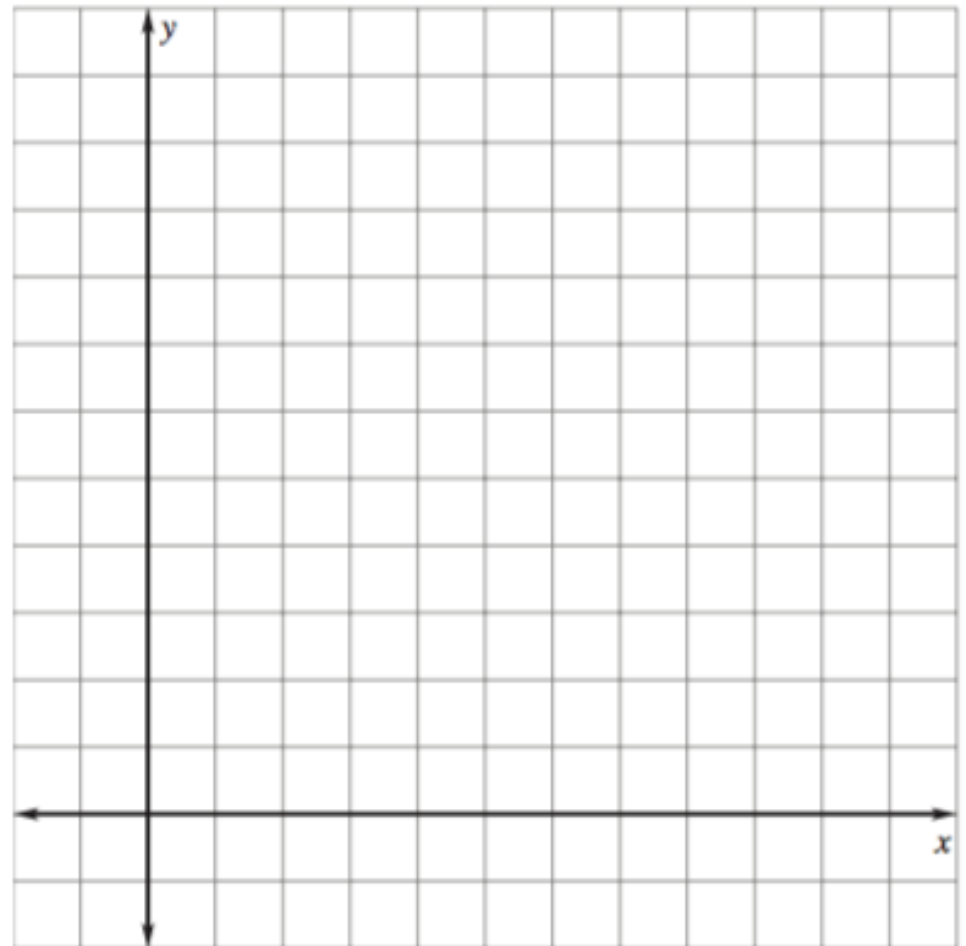
Graph:

Pre-image: A(1, 3), B(5, 2), C(2, 1)

Perform a **glide reflection** using:

Translation $(x, y) \rightarrow (x+5, y-1)$

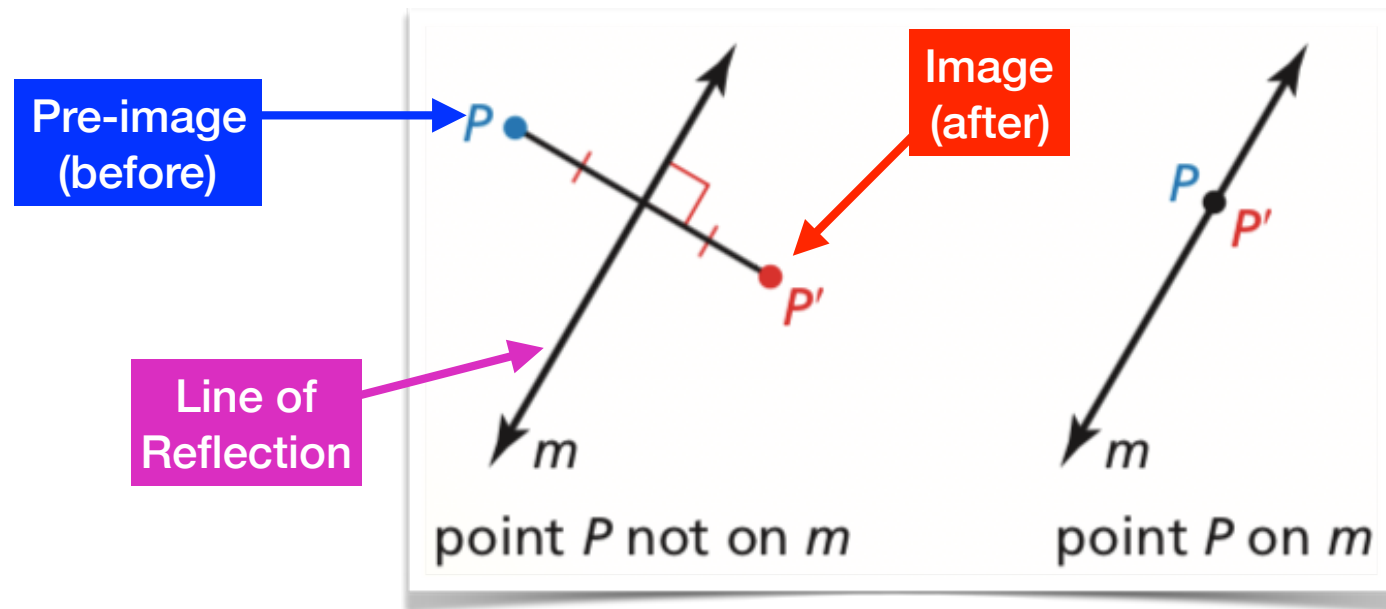
Reflect around $x = 3$



4.2 - Reflections

Vocabulary

Line Symmetry	a figure can be mapped onto itself by a reflection in a line
Line of Symmetry	the reflection line used for line symmetry

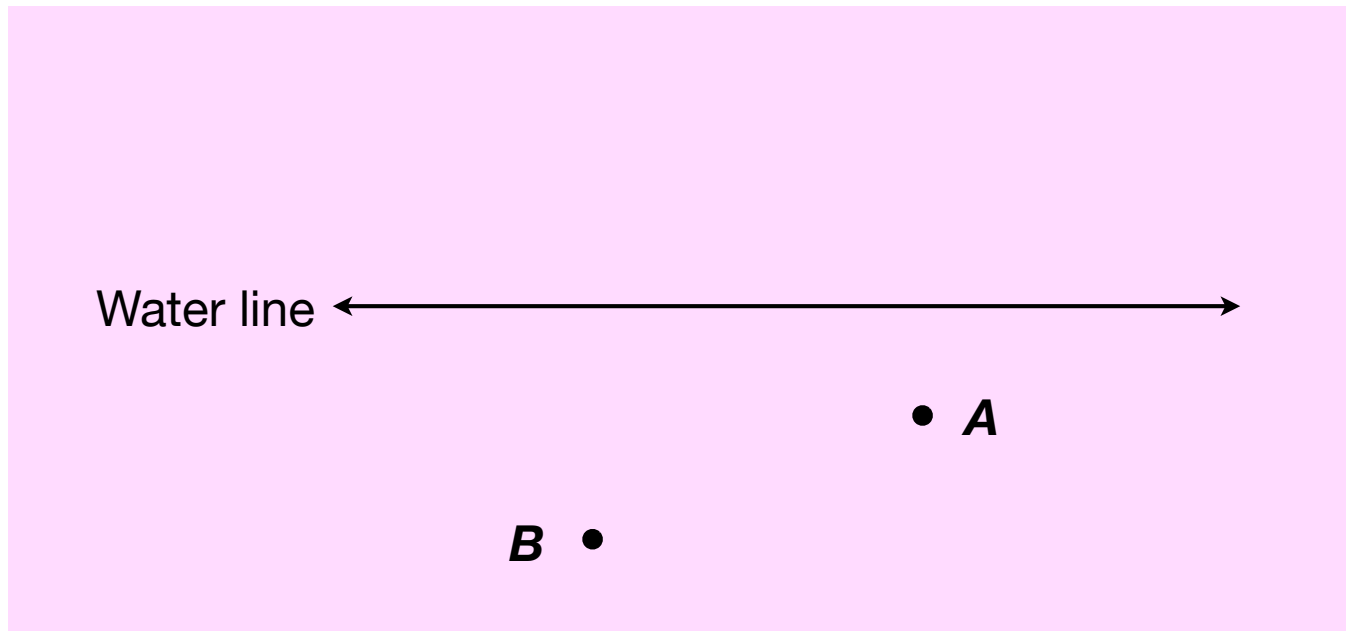


4.2 - Reflections

Problem Solving

- **Water line**

Two buildings located at A and B are to be connected to the same point on the water line. Where should they connect so that the least amount of pipe will be used?



4.2 - Reflections

Lines of Symmetry

How many lines of symmetry does each figure have?

