

Rigid Motions

Lecture 32

Sections 11.1 - 11.2

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- 1 Rigid Motion
- 2 Fixed Points
- 3 Types of Rigid Motions
- 4 Reflections
- 5 Assignment

Outline

- 1 Rigid Motion
- 2 Fixed Points
- 3 Types of Rigid Motions
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- 5 Assignment

Definitions

Definition (Object)

A **object** is any geometric shape or figure whatsoever.

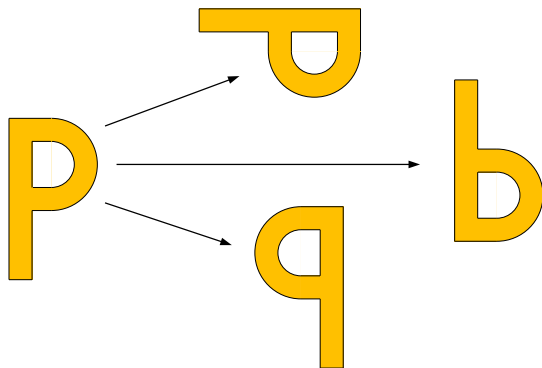
Definition (Rigid Motion)

A **rigid motion** of a object is the act of moving he object to a position without changing the object's shape or size.

Definition (Image)

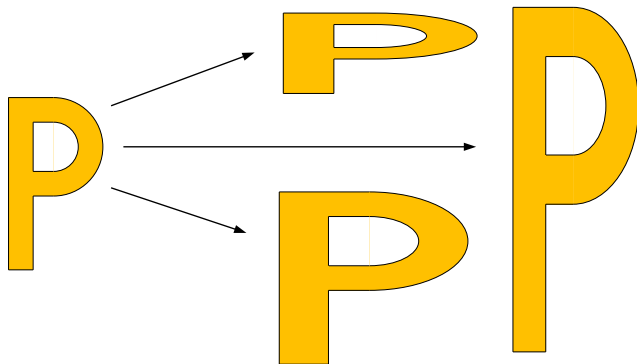
A **rigid motion** of a object is the act of moving he object to a position without changing the object's shape or size.

Examples

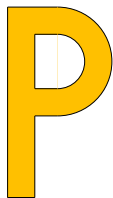


- The object P is moved, but its shape and size are not changed.

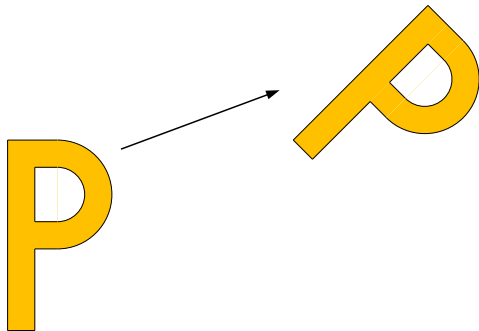
Examples



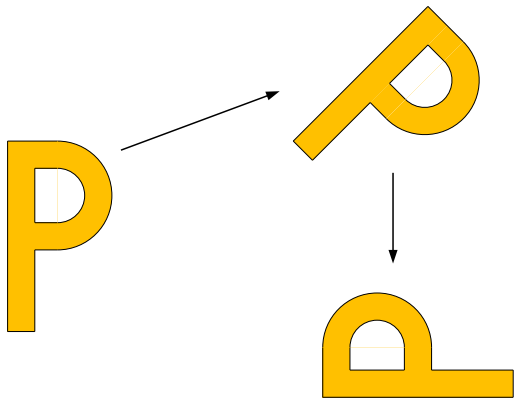
- These are not rigid motions.



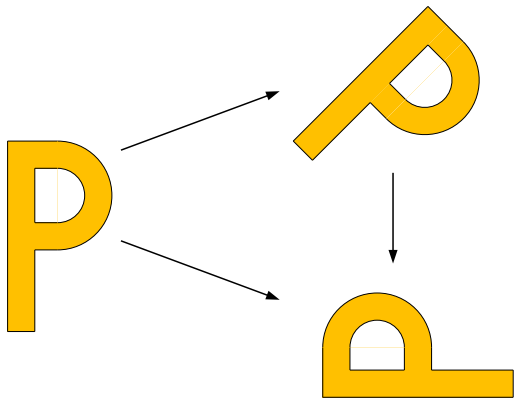
A rigid motion followed by a rigid motion is again a rigid motion



A rigid motion followed by a rigid motion is again a rigid motion



A rigid motion followed by a rigid motion is again a rigid motion



A rigid motion followed by a rigid motion is again a rigid motion

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Definition (Fixed Point)

A **fixed point** of a rigid motion is a point that coincides with its image.

- A rigid motion may have one or more fixed points or it may have no fixed point.

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There are 4 basic types of rigid motion.

- Reflections
- Rotations
- Translations
- Glide reflections

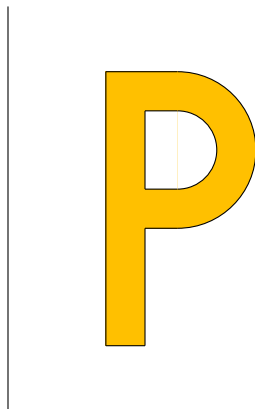
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Definition (Reflections)

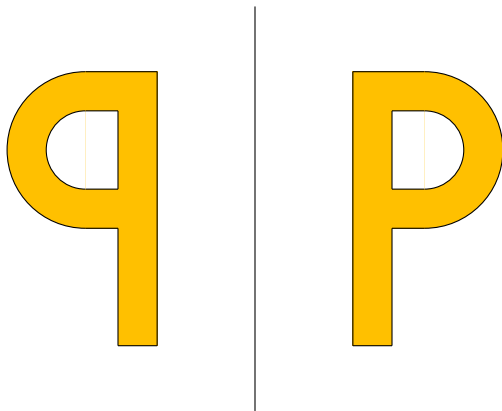
A **reflection** is a rigid motion in which the object's image is a mirror image of the original object.

- A reflection has an **axis** L .
- The image of a point P is a point P' on the opposite side of L and the same distance from L .



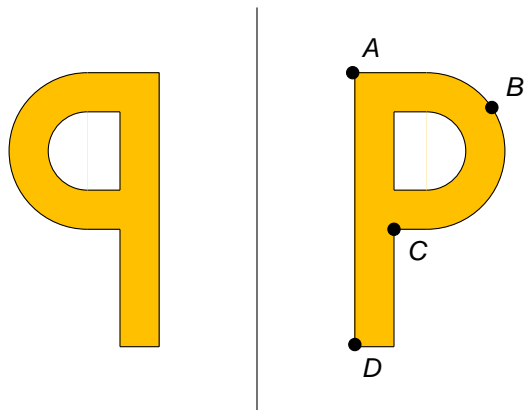
Begin with an object and a line.

Reflections



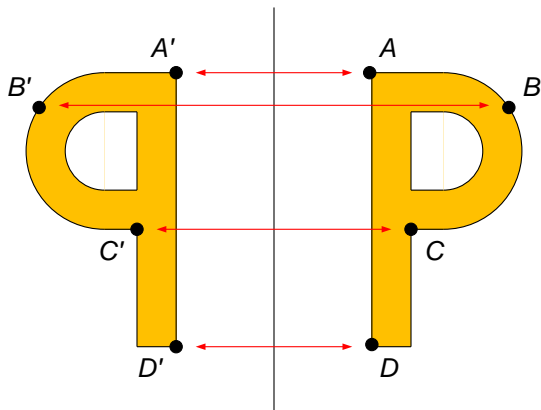
Reflect the object in the line.

Reflections



Consider points A , B , C , D in the original.

Reflections



Find their images A' , B' , C' , D' in the image.

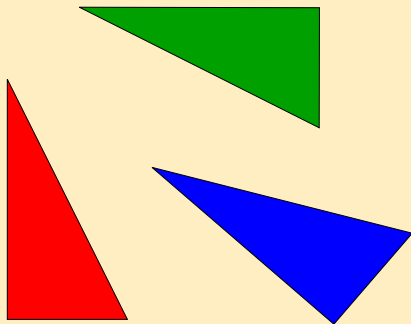
Characteristics of Reflections

Characteristics of Reflections

- A reflection is completely determined by its axis.
- A reflection is completely determined by any point P not on the axis and its image P' .
- The fixed points of a reflection are the points on its axis.
- If we reflect twice in the same line, the result is the **identity** motion.

Characteristics of Reflections

Characteristics of Reflections



- Which triangle is a reflection of the red triangle?

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Assignment

Collected

- Page 254: Exercises 33, 42, 52.

Assignment

- Page 345: Exercises 2, 3, 6, 7.