

Symmetrical Transformation in Geogebra

Talk to a Teacher

<http://spoken-tutorial.org>

National Mission on Education through ICT

<http://sakshat.ac.in>

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Learning Objectives



Learning Objectives

Symmetrical transformations



Learning Objectives

Symmetrical transformations

- ▶ Line symmetry



Learning Objectives

Symmetrical transformations

- ▶ **Line symmetry**
- ▶ **Rotation symmetry**



Learning Objectives

Symmetrical transformations

- ▶ **Line symmetry**
- ▶ **Rotation symmetry**
- ▶ **Enlarge figure with scale and position**



Pre-requisites



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- ▶ We assume that you have the basic working knowledge of Geogebra



Pre-requisites

- ▶ We assume that you have the basic working knowledge of Geogebra
- ▶ If not, for relevant tutorials please visit <http://spoken-tutorial.org>



System Requirement



System Requirement

- ▶ **Ubuntu Linux OS version 11.10**



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- ▶ **Ubuntu Linux OS version 11.10**
- ▶ **Geogebra Version 3.2.47.0**



Geogebra Tools used



Geogebra Tools used

- ▶ **Reflect Object about Line**



Geogebra Tools used

- ▶ **Reflect Object about Line**
- ▶ **Rotate Object around Point by Angle**



Geogebra Tools used

- ▶ **Reflect Object about Line**
- ▶ **Rotate Object around Point by Angle**
- ▶ **Dilate Object from a Point by Factor**



Geogebra Tools used

- ▶ **Reflect Object about Line**
- ▶ **Rotate Object around Point by Angle**
- ▶ **Dilate Object from a Point by Factor**
- ▶ **Semicircle through Two Points**



Geogebra Tools used

- ▶ **Reflect Object about Line**
- ▶ **Rotate Object around Point by Angle**
- ▶ **Dilate Object from a Point by Factor**
- ▶ **Semicircle through Two Points**
- ▶ **Regular Polygon**



Geogebra Tools used

- ▶ **Reflect Object about Line**
- ▶ **Rotate Object around Point by Angle**
- ▶ **Dilate Object from a Point by Factor**
- ▶ **Semicircle through Two Points**
- ▶ **Regular Polygon**
- ▶ **Perpendicular Bisector**



Definition of Transformation



Definition of Transformation

Symmetrical transformation of a geometric figure is -

- ▶ **A change in its position, size or shape on a coordinate plane**



Definition of Transformation

Symmetrical transformation of a geometric figure is -

- ▶ **A change in its position, size or shape on a coordinate plane**
- ▶ **Original figure is called 'Object'**



Definition of Transformation

Symmetrical transformation of a geometric figure is -

- ▶ **A change in its position, size or shape on a coordinate plane**
- ▶ **Original figure is called 'Object'**
- ▶ **Transformed figure is called 'Image'**



Reflection Symmetry



Reflection Symmetry

- ▶ Is also called as **Line symmetry**



Reflection Symmetry

- ▶ Is also called as **Line symmetry**
- ▶ A Type of symmetry where one half is the reflection of the other half



Reflection Symmetry

- ▶ Is also called as **Line symmetry**
- ▶ A Type of symmetry where one half is the reflection of the other half
- ▶ You could fold the image and have both halves match exactly



Reflection Symmetry

- ▶ Is also called as **Line symmetry**
- ▶ A Type of symmetry where one half is the reflection of the other half
- ▶ You could fold the image and have both halves match exactly
- ▶ **Line of Symmetry** is the line over which the figure is reflected



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Definition of Rotation



Definition of Rotation

- ▶ A **Rotation** is a transformation that turns a figure around a fixed center by an angle



Definition of Rotation

- ▶ A **Rotation** is a transformation that turns a figure around a fixed center by an angle
- ▶ If the figure appears unchanged, then figure has **Rotation symmetry**



Definition of Rotation



Definition of Rotation

- ▶ You can rotate object at any **degree** $^{\circ}$ measure



Definition of Rotation

- ▶ You can rotate object at any **degree** $^{\circ}$ measure
- ▶ Rotation can be clockwise and counterclockwise



Dilation



Dilation

- ▶ **Dilation** or enlargement is a transformation



Dilation

- ▶ **Dilation** or enlargement is a transformation
- ▶ in which a figure is enlarged using a scale factor



Summary



Summary

- ▶ Reflection about a line



Summary

- ▶ **Reflection about a line**
- ▶ **Rotation of an object at a point**



Summary

- ▶ **Reflection about a line**
- ▶ **Rotation of an object at a point**
- ▶ **Enlargement of an object by a scale factor**



Assignment



Assignment

- ▶ Draw a Pentagon



Assignment

- ▶ **Draw a Pentagon**
- ▶ **Use Regular Polygon tool to draw**
(Hint: Sides = 5)



Assignment

- ▶ Draw a Pentagon
- ▶ Use Regular Polygon tool to draw (Hint: Sides = 5)
- ▶ Draw a perpendicular bisector to one of the sides of the pentagon



Assignment

- ▶ Draw a Pentagon
- ▶ Use Regular Polygon tool to draw (Hint: Sides = 5)
- ▶ Draw a perpendicular bisector to one of the sides of the pentagon
- ▶ Create a point inside the pentagon



Assignment



Assignment

- ▶ **Set Trace On for the point**



Assignment

- ▶ **Set Trace On for the point**
- ▶ **Get reflection of the point about perpendicular bisector**



Assignment

- ▶ **Set Trace On for the point**
- ▶ **Get reflection of the point about perpendicular bisector**
- ▶ **Set Trace On for image point**



Assignment

- ▶ **Set Trace On for the point**
- ▶ **Get reflection of the point about perpendicular bisector**
- ▶ **Set Trace On for image point**
- ▶ **Trace the pentagon to see if you have selected the correct line of symmetry**



Assignment



Assignment

- ▶ Rotate the original pentagon counter clockwise in 135° at a point



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Assignment

- ▶ Rotate the original pentagon counter clockwise in 135° at a point
- ▶ Dilate the pentagon at a point by the factor of 3



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About the Spoken Tutorial Project

- ▶ Watch the video available at http://spoken-tutorial.org/What_is_a_Spoken_Tutorial
- ▶ It summarises the Spoken Tutorial project
- ▶ If you do not have good bandwidth, you can download and watch it



Spoken Tutorial Workshops

The Spoken Tutorial Project Team

- ▶ Conducts workshops using spoken tutorials
- ▶ Gives certificates to those who pass an online test
- ▶ For more details, please write to contact@spoken-tutorial.org



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- ▶ **Spoken Tutorial Project is a part of the Talk to a Teacher project**
- ▶ **It is supported by the National Mission on Education through ICT, MHRD, Government of India**
- ▶ **More information on this Mission is available at:**

<http://spoken-tutorial.org/NMEICT-Intro>

