

I (Heart) Symmetry



This introduction includes reflection, rotation symmetry, translation, definitions, illustrations, and more.

Symmetry

Some formal definitions:

- the property of being the same or corresponding on both sides of a dividing line.
- when one shape becomes exactly like another if you flip, move, or turn it.

3 Common Types of Symmetry:

Reflection Symmetry ("fold it")

If you can flip or fold a figure over a line and the figure appears the same, then the figure has reflection symmetry.

Sometimes called "line symmetry" or "mirror symmetry".

The 'line of symmetry' will divide the image into 2 identical parts.

Rotation Symmetry ("spin it")

If you can rotate an image around a point (by fewer than 360 degrees) and the image appears unchanged, then it has rotation symmetry.

- To describe this symmetry, you need
- a) the image itself
 - b) the center of rotation
 - c) the angle of rotation

Translation Symmetry ("move it")

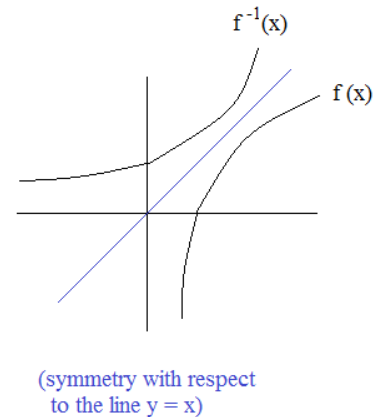
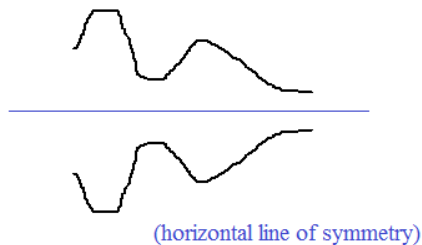
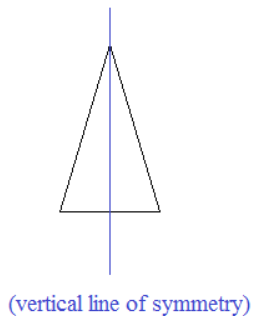
This leaves an object invariant by moving each part the same amount.

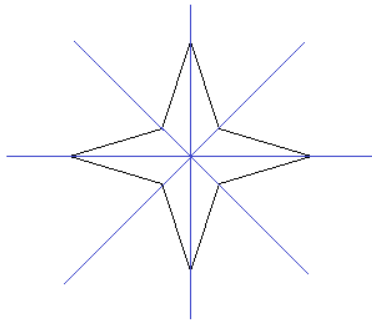
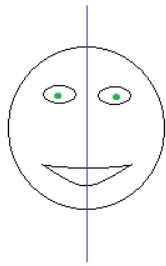
- To describe this symmetry, you must know
- a) the direction of the move
 - b) the magnitude of the move

Shifting a function is a type of translation symmetry, because each point in space moves the same amount in the same direction.

Examples of Symmetry:

Reflection/Line Symmetry

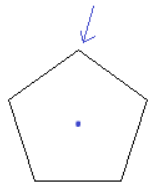
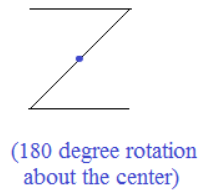
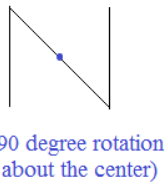
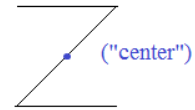




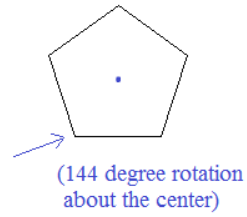
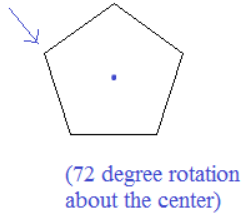
(4 lines of symmetry)

If you fold the figure at any of the (blue) lines of symmetry, the 2 parts will coincide!

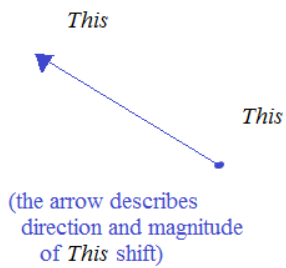
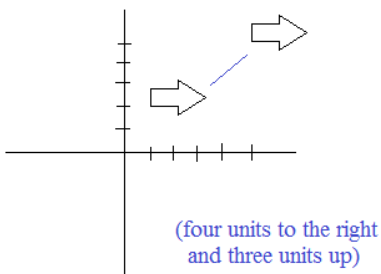
Rotation Symmetry:



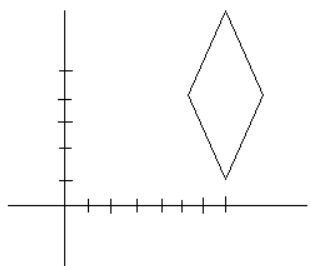
Regular Pentagon



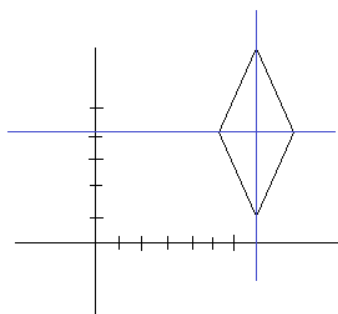
Translation Symmetry:



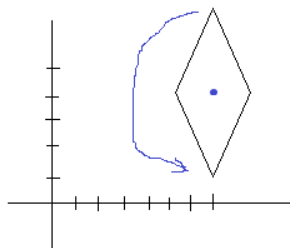
Reflection, Rotation, and Translation Symmetry



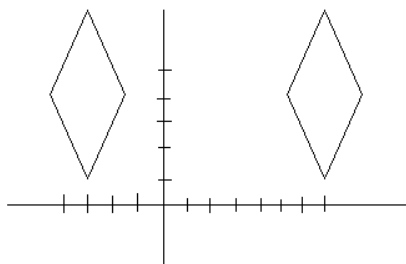
Identify the lines of symmetry.
Does the figure have rotation symmetry?



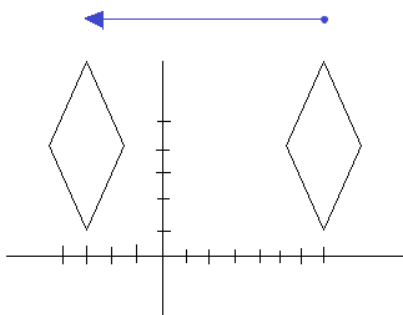
horizontal line of symmetry: $y = 4.2$
vertical line of symmetry: $x = 7$



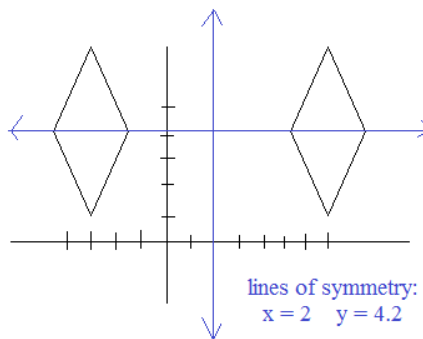
rotational symmetry:
center: $(7, 4.2)$
angle: 180 degrees



After adding an identical diamond, what types of symmetry are illustrated?

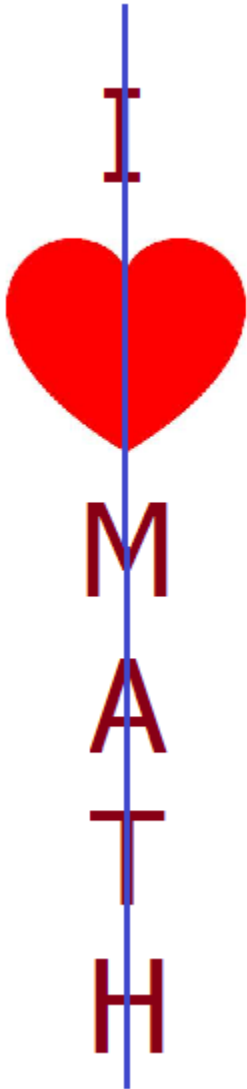


translation: 10 units to the left



lines of symmetry:
 $x = 2$ $y = 4.2$

rotational symmetry:
center: $(2, 4.2)$
angle: 180 degrees



Vertical and Horizontal Symmetry!



1) Which letters of the alphabet have lines of symmetry? Which have rotation symmetry?

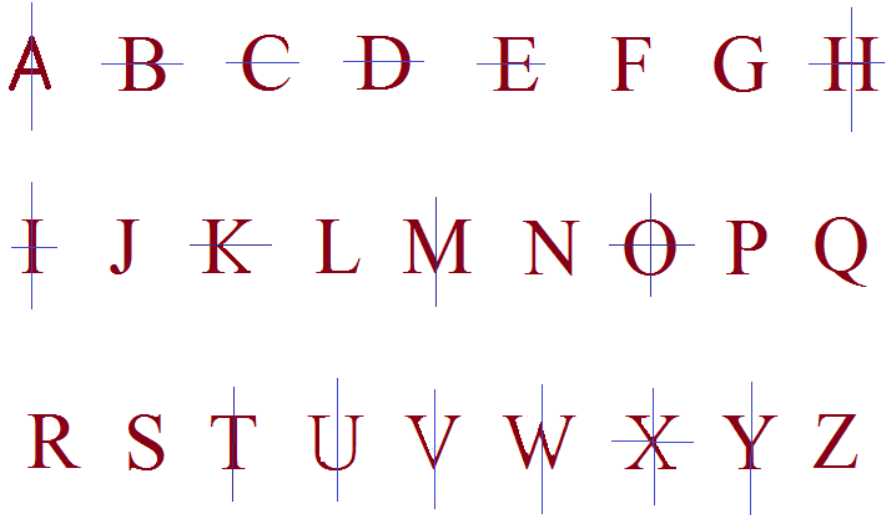
2) How many lines of symmetry does the number zero have? (Consider a circle or an ellipse)

Answers on the next page -->

Symmetry Discussion Questions:

- 1) Which letters of the alphabet have lines of symmetry? Rotation symmetry?
- 2) How many lines of symmetry does the number zero have? (Consider a circle or an ellipse)

1) Lines of Symmetry



(note: the letters are Times New Roman Fonts)

Rotation Symmetry:

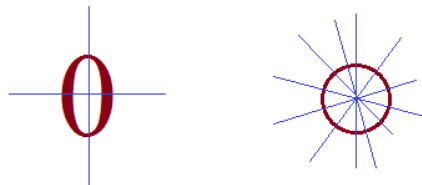


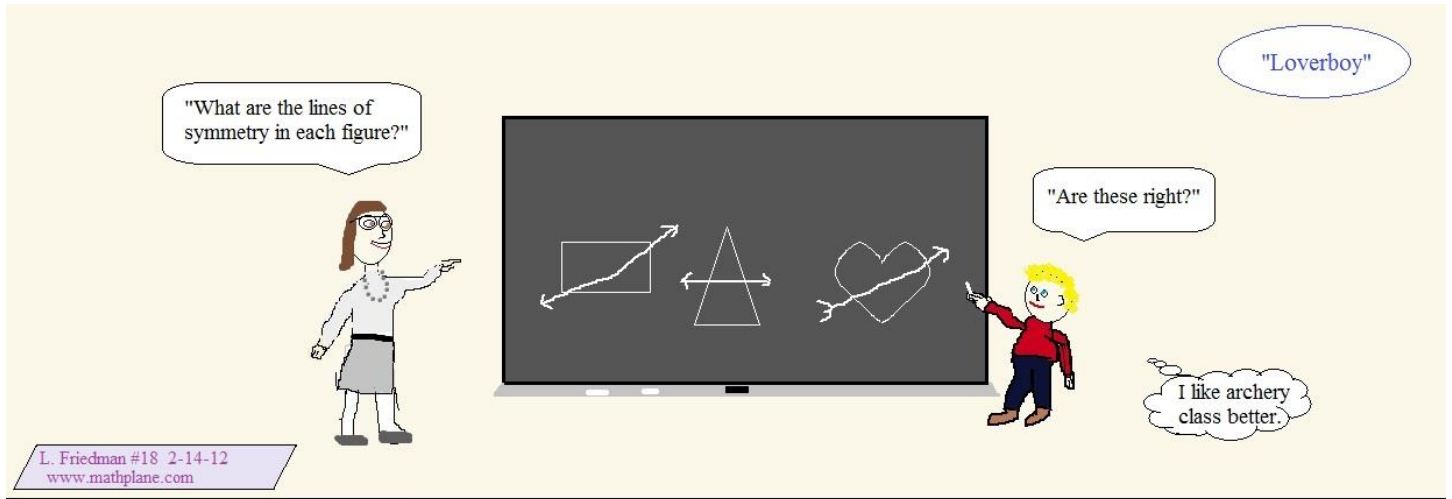
(180 degrees rotated around the center)

- 2) The number of lines of symmetry in zero would depend on the font!

A zero shaped like an ellipse would have 2 lines of symmetry: horizontal and vertical.

A zero shaped like a circle would have countless lines of symmetry: any line through the center.





Struggling in Geometry, young Cupid realizes that he's not destined for a math career.

Thanks for visiting.

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