Symmetry

Viviana C. Castellón

East Los Angeles College

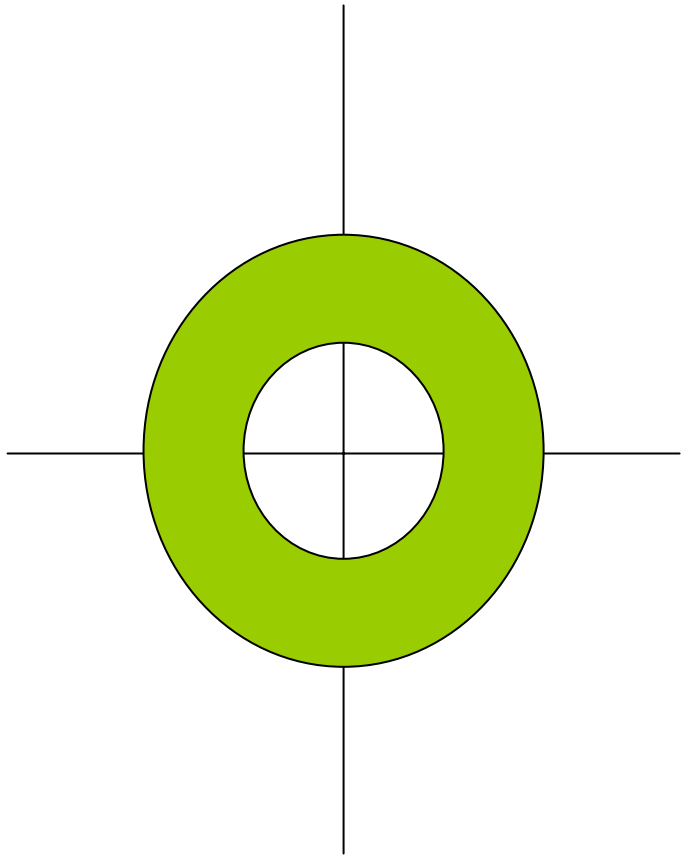
MEnTe

Mathematics Enrichment through Technology

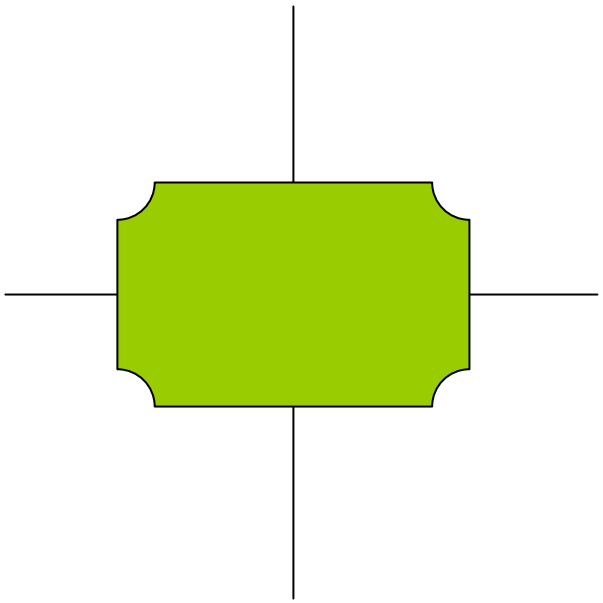
Symmetric with Respect to the origin

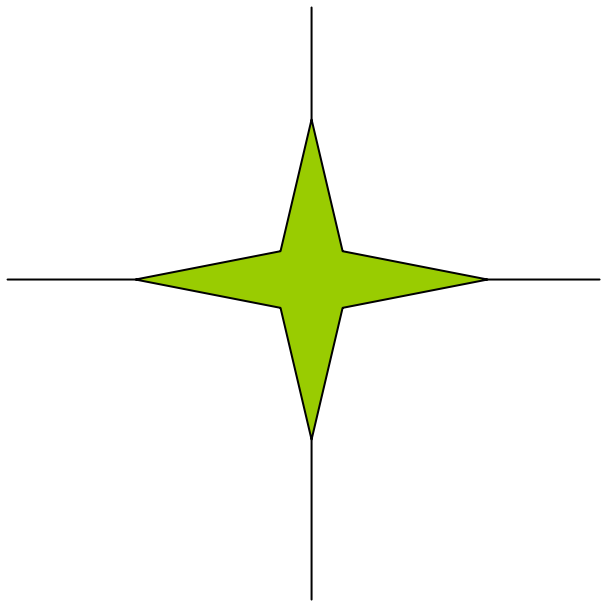
A graph that is symmetric to the origin, can be seen as slicing a figure vertically and horizontally. In other words, for every point (x,y) on the graph, the point (-x,-y) is also on the graph.

The figure illustrates symmetric with respect to the origin. A reflection about the y-axis, followed by a reflection about the x-axis.



The following figures illustrate symmetric with respect to the origin





Testing for Symmetry with respect to the origin

Substitute -x for every x and a –y for every y, in the equation. If the equation is EXACTLY as the original equation, the graph is symmetric with respect to the origin.

Testing for Symmetry with respect to the origin

The following equation is given: $x^2 = 3y^2 + 7$

Substitute –x for every x and –y for every y.

$$(-x)^2 = 3(-y)^2 + 7$$

$$x^2 = 3y^2 + 7$$

Since the equation is EXACTLY the same as the original equation, then the graph is symmetric with respect to the origin.

Is the following equation symmetric with respect to the origin?

$$5x^2 - 3y^2 + 12 = 0$$

$$5x^2 - 3y^2 + 12 = 0$$

$$5(-x)^2 - 3(-y)^2 + 12 = 0$$

$$5x^2 - 3y^2 + 12 = 0$$

After substituting a –x for every x and a –y for every y,the equation is EXACTLY the same as the original. Therefore, the equation is symmetric with respect to the origin.

Is the following equation symmetric with respect to the origin?

$$x^2 - 5x - y^2 + 3y + 17 = 0$$

$$x^2 - 5x - y^2 + 3y + 17 = 0$$

$$(-x)^2 - 5(-x) - (-y)^2 + 3(-y) + 17 = 0$$

$$x^2 + 5x - y^2 - 3y + 17 = 0$$

After substituting a -x for every x and a -y for every y, the equation is NOT EXACTLY the same as the original. Therefore, the equation is NOT symmetric with respect to the origin.

Is the following equation symmetric with respect to the origin?

$$y = \frac{x^2 - 4}{2}$$

$$y = \frac{x^2 - 4}{2}$$

$$(-y) = \frac{(-x)^2 - 4}{2}$$

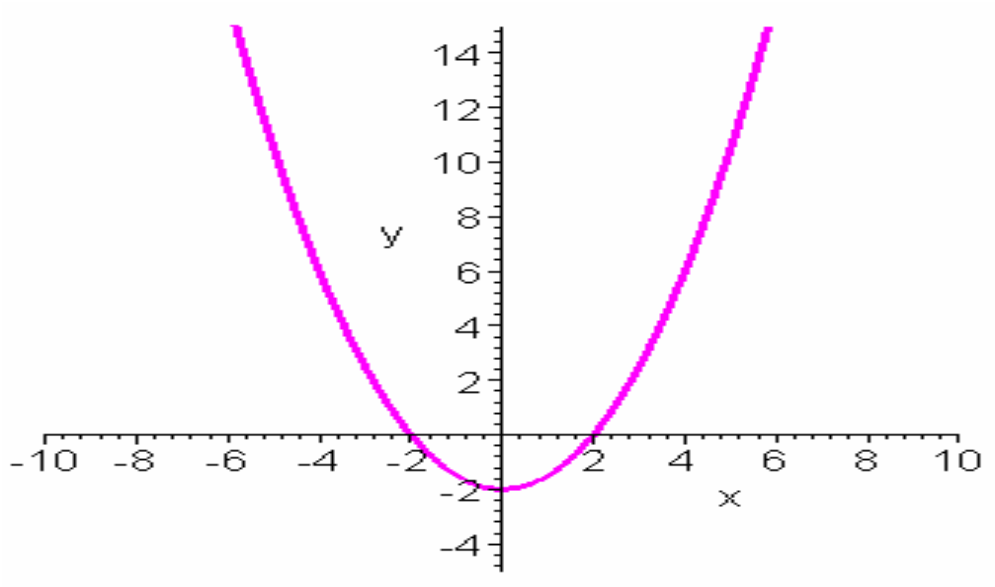
$$-y = \frac{x^2 - 4}{2}$$

$$y = -\frac{x^2 - 4}{2}$$

After substituting a -x for every x and a -y for every y, the equation is NOT EXACTLY the same as the original. Therefore, the equation is NOT symmetric with respect to the origin.

The function could also be graphed to show that it is NOT symmetric with respect to the origin.

$$y = \frac{x^2 - 4}{2}$$



Is the following equation symmetric with respect to the origin?

$$y = \frac{2x^2 + 5}{7x}$$

$$y = \frac{2x^2 + 5}{7x}$$

$$(-y) = \frac{2(-x)^2 + 5}{7(-x)}$$

$$-y = \frac{2x^2 + 5}{-7x}$$

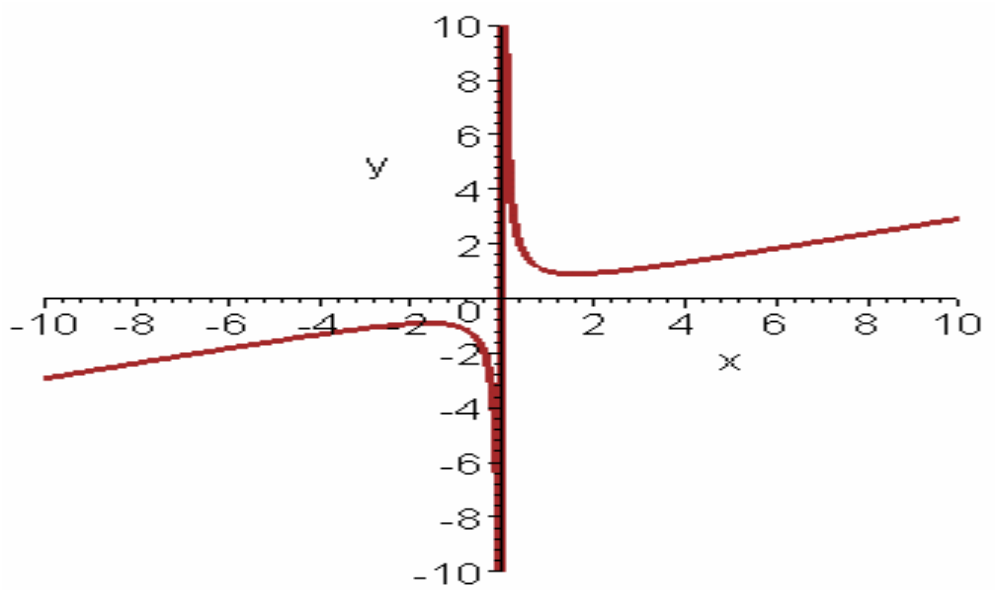
$$y = -\frac{2x^2 + 5}{-7x}$$

$$y = \frac{2x^2 + 5}{7x}$$

After substituting a -x for every x and a -y for every y, the equation is EXACTLY the same as the original. Therefore, the equation is symmetric with respect to the origin.

The function could also be graphed to show that it is symmetric with respect to the origin.

$$y = \frac{2x^2 + 5}{7x}$$



Congratulations!!

You just completed symmetric with respect to the origin