Symmetry

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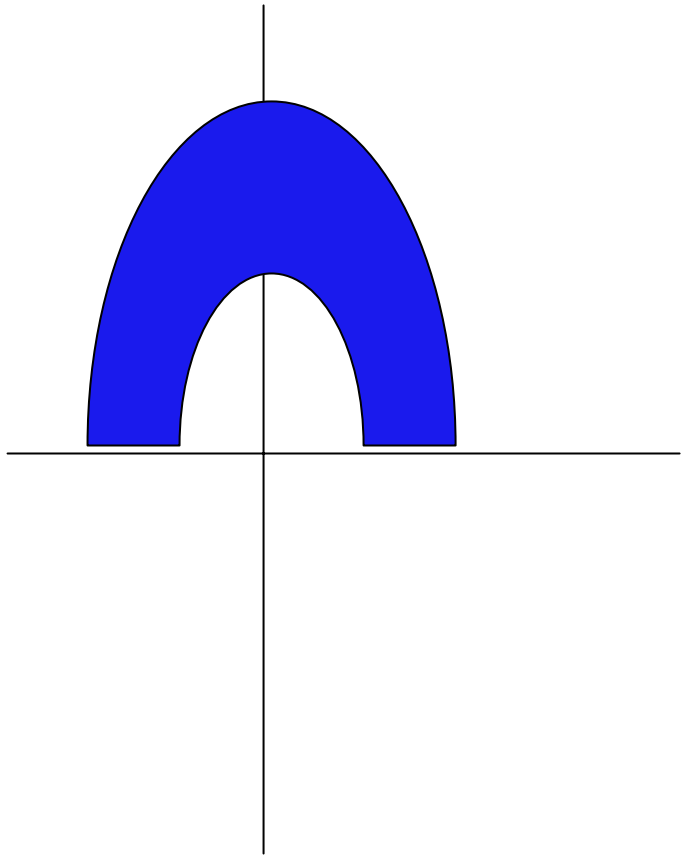
MEnTe

Mathematics Enrichment through Technology

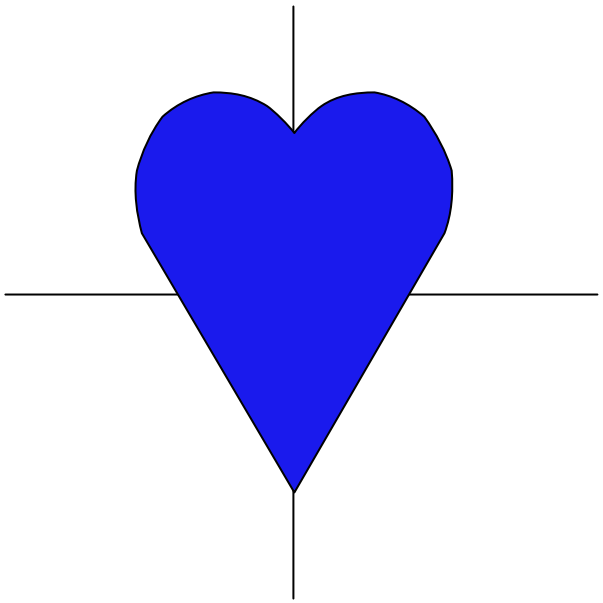
Symmetric with Respect to the y-Axis

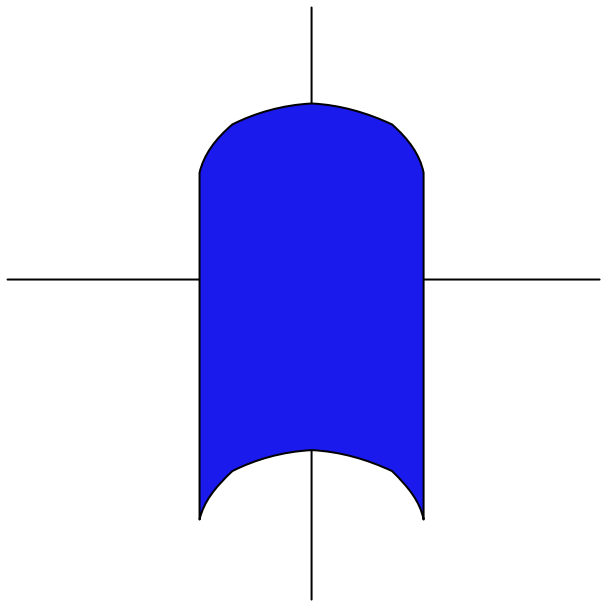
A graph that is symmetric to the y-axis, can be seen as slicing a figure vertically. In other words, for every point (x,y) on the graph, the point (-x,y) is also on the graph.

The figure illustrates symmetric with respect to the y-axis. The part of the graph to the right of the y-axis is a reflection (mirror image) of the part to the left of the y-axis.



The following figures illustrate symmetric with respect to the y-axis





Testing for Symmetry with respect to the y-axis

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

Testing for Symmetry with respect to the y-axis

The following equation is given: $x^2 = 3y^2 - 4y + 7$

Substitute -x for every x. $(-x)^2 = 3y^2 - 4y + 7$

$$x^2 = 3y^2 - 4y + 7$$

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

Is the following equation symmetric with respect to the y-axis?

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

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

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

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

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

Is the following equation symmetric with respect to the y-axis?

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

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

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

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

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

Is the following equation symmetric with respect to the y-axis?

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

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

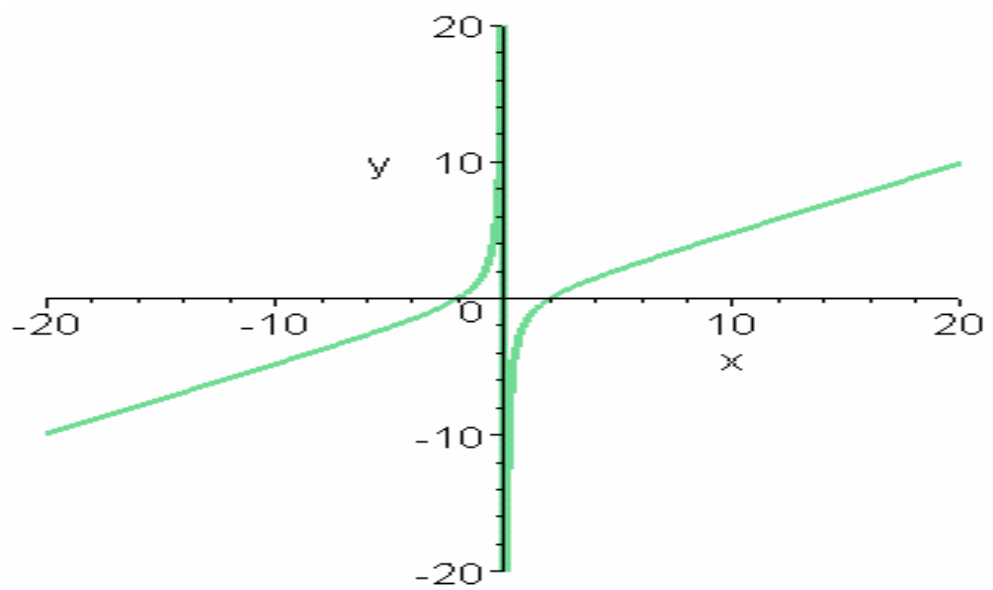
$$y = \frac{(-x)^2 - 4}{2(-x)}$$

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

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

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

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



Is the following equation symmetric with respect to the y-axis?

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

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

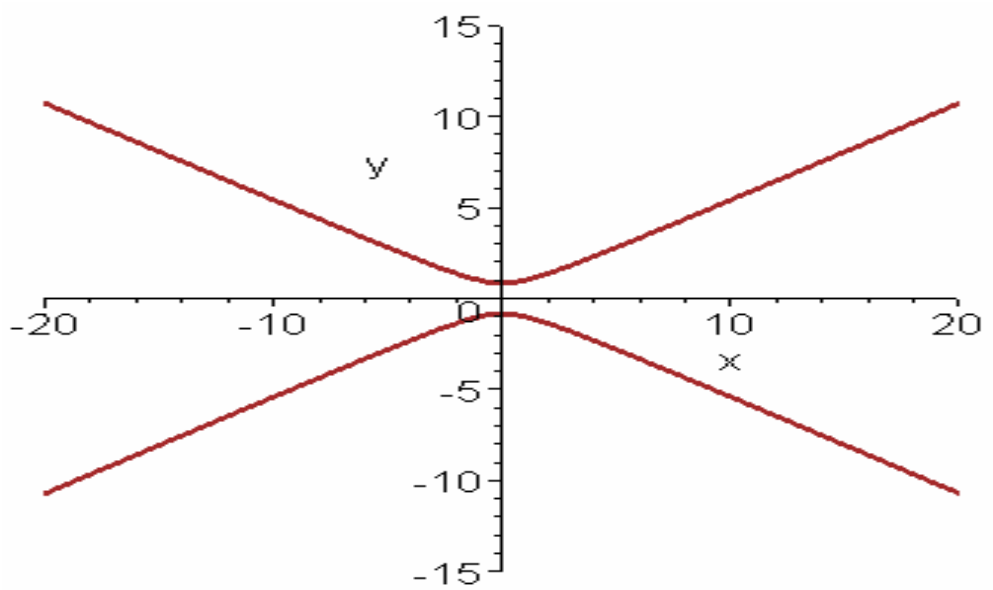
$$y^2 = \frac{2(-x)^2 + 5}{7}$$

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

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

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

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



Congratulations!!

You just completed symmetric with respect to the y-axis