

2.2 Graphs of Equations in Two Variables; Intercepts; and Symmetry

Graphing by Plotting Points: *use a table*

<i>x</i>	<i>equation (show work)</i>	<i>y</i>	<i>(x, y)</i>
----------	-----------------------------	----------	---------------

How to find:

y-intercept?
let $x=0$ & solve
list as $(0, ?)$

x-intercept(s)?
let $y=0$ & solve
list as $(?, 0)$

A graph is **symmetric with respect to the** *x-axis* if for every point

(x, y) on the graph, the point *(x, -y)* is also on the graph.

A graph is **symmetric with respect to the** *y-axis* if for every point

(x, y) on the graph, the point *(-x, y)* is also on the graph.

A graph is **symmetric with respect to the** *origin* if for every point

(x, y) on the graph, the point *(-x, -y)* is also on the graph.

Testing for Symmetry:

x-axis	Replace <u><i>y</i></u> with <u><i>-y</i></u> in the equation and <u><i>simplify</i></u> . If the equation is <u><i>the same</i></u> as the original, then the graph of the equation is symmetric with respect to the x- axis.
y-axis	Replace <u><i>x</i></u> with <u><i>-x</i></u> in the equation and <u><i>simplify</i></u> . If the equation is <u><i>the same</i></u> as the original, then the graph of the equation is symmetric with respect to the y- axis.
Origin	Replace <u><i>xy</i></u> with <u><i>-x-y</i></u> in the equation and <u><i>simplify</i></u> . If the equation is <u><i>the same</i></u> as the original, then the graph of the equation is symmetric with respect to the origin.

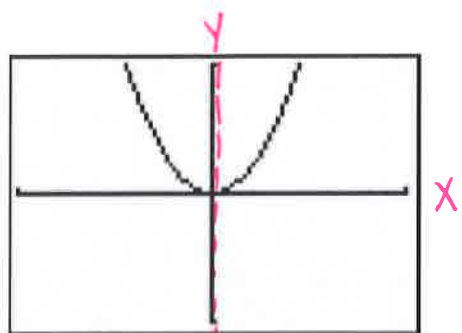
Which symmetries make the graphs functions? *y-axis, origin*

Do you have to test all three? *yes ex \oplus a circle is symmetric to all three*

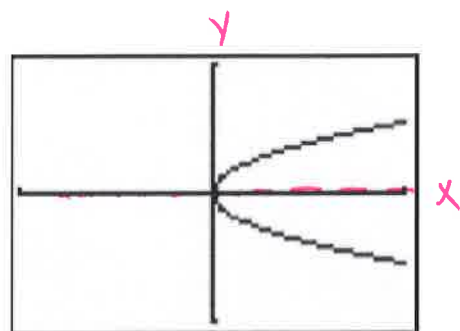
How to Properly Show your Tests: *$y=x^3$*

<i>x-axis</i>	<i>y-axis</i>	<i>origin</i>
$(-y) = x^3$ $-y = x^3$ $y = -x^3$ NOT symmetric	$y = (-x)^3$ $y = -x^3$ NOT symmetric	$(-y) = (-x)^3$ $-y = -x^3$ $y = x^3$ Yes, symmetric with respect to the origin

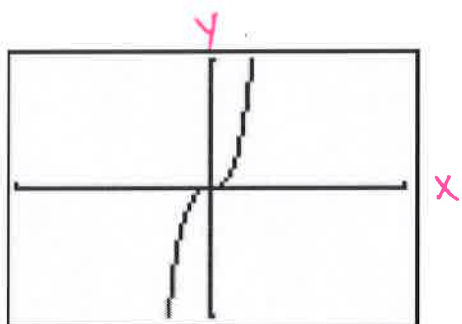
Graphs of Key Equations



$y = x^2$
Symmetric w/ respect
to y-axis



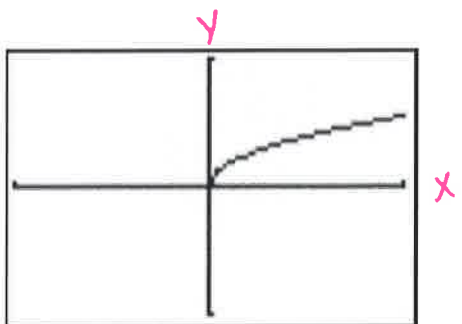
$x = y^2$
Symmetric w/ respect
to x-axis



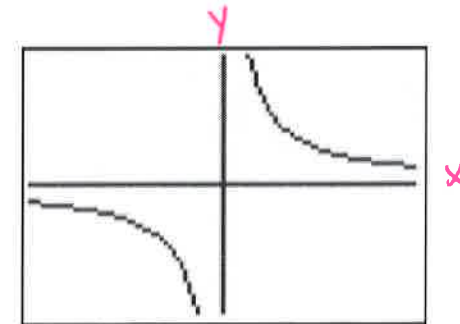
$y = x^3$
Symmetric w/ respect
to origin



$y = \sqrt[3]{x}$
Symmetric w/ respect
to origin



$y = \sqrt{x}$
Not Symmetric



$y = \frac{1}{x}$
Symmetric w/ respect
to origin