

Section 2.2

Graphs of Equations in Two Variables; Intercepts; Symmetry

THE GRAPH OF AN EQUATION

The **graph of an equation** in the two variables x and y is the set of all points whose coordinates satisfy the equation.

PROCEDURE FOR GRAPHING AN EQUATION

1. If necessary, solve the equation for y .
2. Pick values to substitute for x and make a table with x and y values.
3. Plot the points from Step 2 on the xy -plane.
4. Connect the points.

NOTE: Be sure to pick enough points so you can see the pattern for the graph.

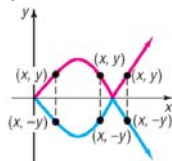
INTERCEPTS

Some important points in a graph are the x - and y -intercepts. The **x -intercept** of a graph is a place where the graph intersects the x -axis. The **y -intercept** of a graph is a place where the graph intersects the y -axis.

- To find the **x -intercept(s)**, if any, of the graph of an equation, let $y = 0$ in the equation and solve for x , where x is a real number.
- To find the **y -intercept(s)**, if any, of the graph of an equation, let $x = 0$ in the equation and solve for y , where y is a real number.

SYMMETRY WITH RESPECT TO THE x -AXIS

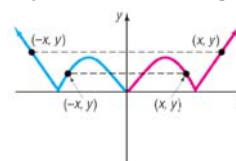
A graph is said to be **symmetric with respect to the x -axis** if, for every (x, y) on the graph, the point $(x, -y)$ is also on the graph.



Symmetry with respect to the x -axis

SYMMETRY WITH RESPECT TO THE y -AXIS

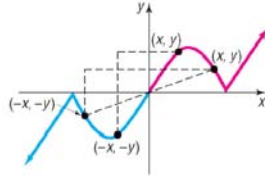
A graph is said to be **symmetric with respect to the y -axis** if, for every (x, y) on the graph, the point $(-x, y)$ is also on the graph.



Symmetry with respect to the y -axis

SYMMETRY WITH RESPECT TO THE ORIGIN

A graph is said to be **symmetric with respect to the origin** if, for every (x, y) on the graph, the point $(-x, -y)$ is also on the graph.



Symmetry with respect to the origin

TESTS FOR SYMMETRY

To test the graph of an equation for symmetry with respect to

- x-axis** Replace y by $-y$ in the equation and simplify. If an equivalent equation results, the graph of the equation is symmetric with respect to the x -axis.
- y-axis** Replace x by $-x$ in the equation and simplify. If an equivalent equation results, the graph of the equation is symmetric with respect to the y -axis.
- origin** Replace x by $-x$ and y by $-y$ in the equation and simplify. If an equivalent equation results, the graph of the equation is symmetric with respect to the origin.