**III. Symmetry, Transformation of Functions, and Inverse Functions**

After completing this section, you should be able to:

* assess the symmetry of a graph with respect to the *x*-axis, the *y*-axis, and the origin
* determine whether a function is even, odd, or neither
* graph a function obtained by shifting, reflecting, stretching, or shrinking another graph
* determine whether a function is one-to-one and has an inverse

**A. Symmetry**

Graphs may exhibit certain types of symmetry. It is often useful to identify whether a graph is symmetric with respect to the *x*-axis, the *y*-axis, or the origin.

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| --- | --- | --- |
| **Type of Symmetry** |  | **Symmetry Condition** |
| Symmetry with respect to the *x*-axis | Symmentry | Replacing *y* with –*y* produces an equivalent  equation. |
| Symmetry with respect to  the *y*-axis | Symmetry | Replacing *x* with –*x* produces an equivalent equation. |
| Symmetry with respect to the *origin* | Symmetry | Replacing *x* with –*x* and *y* with –*y* produces an equivalent equation. |