

## Even and Odd Functions

### Aim

To show how to determine if a function is even or odd.

### Learning Outcomes

At the end of this section you will be able to:

- Tell the difference between even and odd functions,
- Test a given function to see if it is even or odd.

### Even Functions

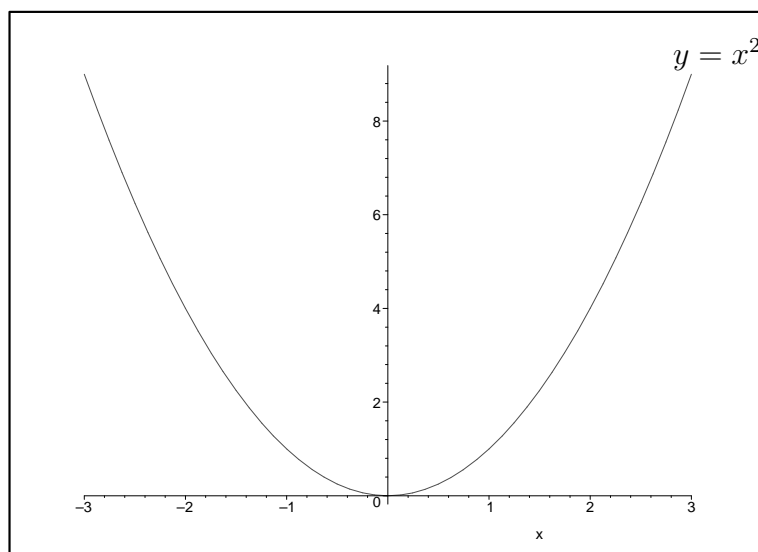
If a function  $f$  is such that

$$f(-x) = f(x)$$

the function is said to be **even**. For example look at the function

$$f = x^2.$$

It is clear to see that  $(-x)^2 = x^2$ , so the function that squares the input is an even function. The graph of an even function is symmetrical about the vertical coordinate axis ( $y$ -axis) as is displayed in the graph of the function  $y = x^2$  below.



## Odd Functions

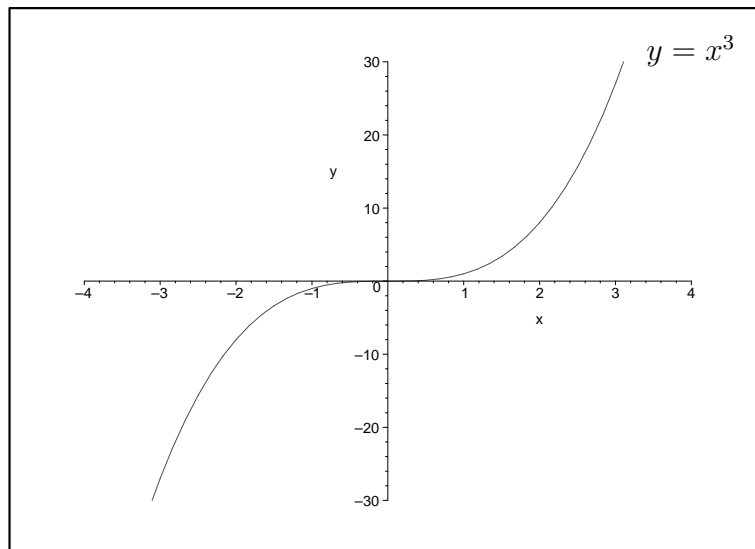
If a function  $f$  is such that

$$f(-x) = -f(x)$$

the function is said to be **odd**. For example look at the function

$$f = x^3.$$

It is clear to see that  $(-x)^3 = -(x^3)$ , so the function that cubes the input is an odd function. The graph of an odd function is not symmetrical (also called asymmetrical) about the vertical coordinate axis ( $y$ -axis) as is displayed in the graph of the function  $y = x^3$  below. It is however symmetrical through the origin.



## Related Reading

Booth, D.J. 1998. *Foundation Mathematics*. 3<sup>rd</sup> Edition. Pearson Education Limited.