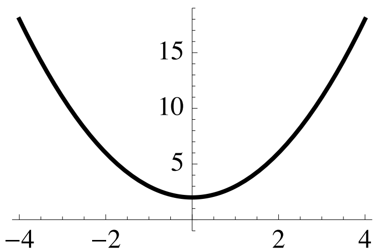
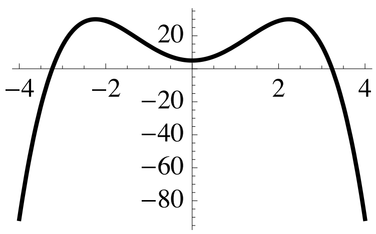
Even Functions

Functions can be described as *odd*, *even* or neither.

A quadratic equation of the form $f(x) = a\,x^2 + k$ is an example of an *even* function. Here is the graph of $f(x) = x^2 + 2$:



Notice how the parabola above is symmetrical about the y-axis: all even functions are symmetrical about the y-axis. Here is another example, $f(x) = -x^4 + 10\,x^2 + 5$:



When you studied rigid motion in Grade 9 (translation, rotation, and reflection), you would have studied what happens to the x- and y-values to a graph when it is reflected across the y-axis:

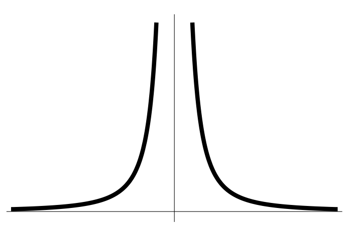
$$(x, y) \Longrightarrow (-x, y)$$

In words, the reflection causes the x-values to be multiplied by -1(positive x values become negative and negative x values become positive), but the y-values don't change. Another way of stating this using function notation is that all even functions have the property:

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

A function does not have to a polynomial for it to be an even function. Rational functions and trig functions can also be even functions:

$f(x) = \dfrac{1}{x^2}$



$f(x) = \cos(x)$