Polynomials

math612.0 A1: From numbers through algebra to calculus and linear algebra

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The general polynomial

The general polynomial:
$p(x) = a_0 + a_1 x + a_2 x^2 + ... + a_n x^n$
The simplest: $p(x) = a$

The quadratic

The general form of the quadratic (parabola) is $p(x) = ax^2 + bx + c$.
The simplest quadratic is $p(x) = x^2$

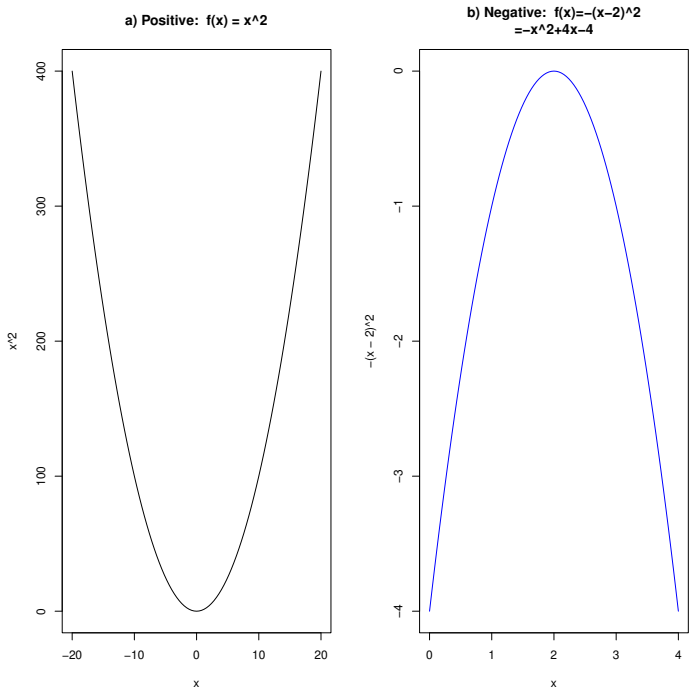

Figure: Parabolas: Quadratic functions.

The cubic

The general form of a cubic polynomial is:
$p(x) = ax^3 + bx^2 + cx + d$

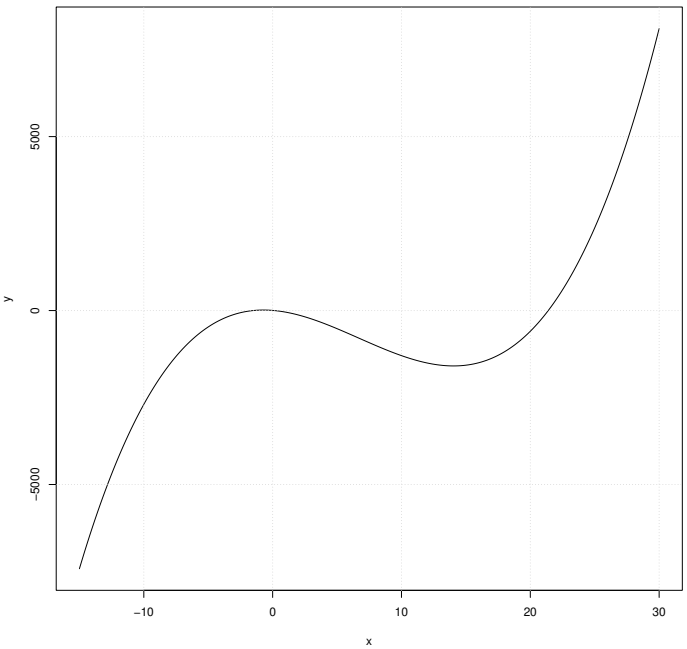

Figure: $y = x^3 - 20x^2 - 30x - 4$

The Quartic

The general form of the quartic polynomial is $p(x) = ax^4 + bx^3 + cx^2 + dx + e$

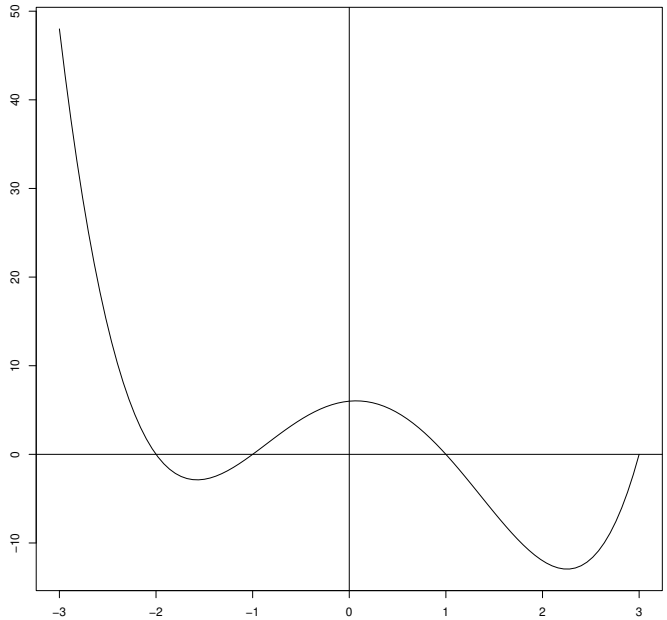

Figure: The general shape. Here we used the following equation $y = x^4 - x^3 - 7x^2 + x + 6$

Solving the linear equation

If the value of y is given and we know that x and y are on a specific line so that $y = a + bx$, then we can find the value of x

Roots of the quadratic equation

The general solution of $ax^2 + bx + c = 0$ is given by $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$.

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