

Section 3.2 Polynomial Functions and Their Graphs

Definition of a Polynomial Function

Let n be a nonnegative integer and let $a_n, a_{n-1}, \dots, a_2, a_1, a_0$ be real numbers, with $a_n \neq 0$. The function defined by

$$f(x) = a_n x^n + a_{n-1} x^{n-1} + \dots + a_2 x^2 + a_1 x + a_0$$

is called a **polynomial function of degree n** . The number a_n , the coefficient of the variable to the highest power, is called the **leading coefficient**.

Smooth and Continuous Polynomial Functions of Degree 2 or Higher

Polynomial functions of degree 2 or higher have graphs that are smooth and continuous.

- Graphs that contain only rounded curves with no sharp corners are smooth.
- Graphs that have no breaks (and can be drawn without lifting your pencil from the rectangular coordinate systems) are continuous.

Example 1. Determine which functions are polynomial functions. For those that are, identify the degree.

Identify which graphs are not those of polynomial functions.

