

Polynomial Functions

A **polynomial function of degree n** is a function of the form

$$P(x) = a_n x^n + a_{n-1} x^{n-1} + \cdots + a_1 x + a_0$$

where n is a nonnegative integer and $a_n \neq 0$.

The numbers $a_0, a_1, a_2, \dots, a_n$ are called the **coefficients** of the polynomial.

The number a_0 is the **constant coefficient** or **constant term**.

The number a_n , the coefficient of the highest power, is the **leading coefficient**, and the term $a_n x^n$ is the **leading term**.

EXAMPLES: $P(x) = 3$, $Q(x) = 4x - 7$, $R(x) = x^2 + x$, $S(x) = 2x^3 - 6x^2 - 10$

QUESTION: Which of the following are polynomial functions?

(a) $f(x) = -x^3 + 2x + 4$

(c) $f(x) = (x - 2)(x - 1)(x + 4)^2$

(b) $f(x) = (\sqrt{x})^3 - 2(\sqrt{x})^2 + 5(\sqrt{x}) - 1$

(d) $f(x) = \frac{x^2 + 2}{x^2 - 2}$

Answer: (a) and (c)