# Definition of Polynomial Functions

Name _____

Date _____ Period _____

A polynomial function is a function in the form...

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

where $a_n$, $a_{n-1}$, ... , $a_1$, $a_0$ are real numbers and $n$ is a nonnegative integer.

$a_n$, $a_{n-1}$, ... , $a_1$, $a_0$ are coefficients on variable

coefficients must be real numbers

$n$ must be positive integer

no fractions in exponents

$$f(x) = 5x^2 + 4x + 2$$

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$$f(x) = \sqrt{x} + 10$$

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$$f(x) = \frac{3x^2 - 10x}{6x^3 + 3}$$

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no fractions in exponents

$$f(x) = 5x^3 - 6x^2$$

The degree of a polynomial function is the largest power of $x$ or largest exponent of $x$ that appears.

**Zero Function**

$f(x) = 0$

**Constant Function**

$f(x) = 5 = 5x^0$

**Linear Function**

$f(x) = x - 4$

**Quadratic Function**

$f(x) = 5x^2 + 4x + 2$

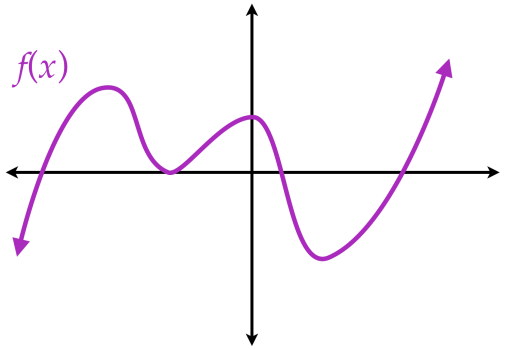
**Cubic Function**

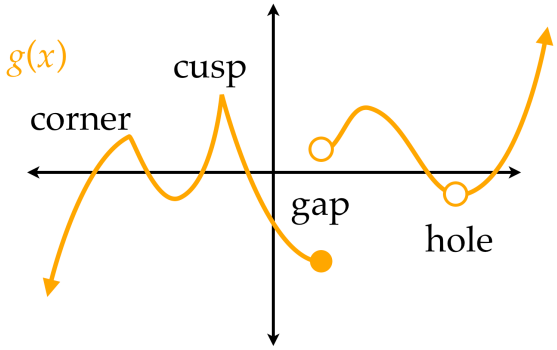
$f(x) = x^3 - 3x^2$

The graph of a polynomial function is always smooth and continuous.

smooth: the graph contains no sharp corners or cusps

continuous: the graph has no gaps or holes; can be drawn without lifting pencil



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Zero Function  Constant Function  Linear Function

Quadratic Function  Cubic Function

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