

A **polynomial** is a math expression made up of terms connected by addition or subtraction. A polynomial can have coefficient(s), variable(s), whole number exponent(s) and/or constant that can be combined using addition, subtraction, multiplication and division, except division by a variable.

Some examples of polynomials are shown below.

$3x^2$ $6x + 7y - 14$ $81m^2 - 2.2y^2$ $-m^7 - \frac{3}{5}x^4 + \frac{1}{4}t^2$

Fractional exponents are not allowed. No negative exponent

Polynomials have whole number positive exponents. The following math expressions are NOT polynomials. Do you know why?

$\frac{3}{x^2} \rightarrow 3(x)^{-2}$

$6x + 10x^{-4}$
(negative exponent)

$\sqrt{7m} \rightarrow 7m^{\frac{1}{2}}$ $(5x+2y) \times (9y)^{-1}$

$\frac{5x+2y}{9p}$

Because they are division by a variable. \rightarrow you cannot divide by a variable.

A polynomial may have a special name depending on how many terms it has.

Sample Polynomial	# of terms	'Special' Name
$4x^2$	1	Monomial
$2a^3 + 7$	2	Binomial
$x^2 + 2x + 8$	3	Trinomial
$14abc + 7z - 3x + 19$	4	Quadrinomial

\rightarrow you can divide by a constant \rightarrow (eg. $\frac{x}{2}$, $\frac{3x}{4}$, $\sqrt{2}$)

Examples of Polynomials

$\rightarrow 4x$

$\rightarrow x - 4$

$\rightarrow -6x^2 - \left(\frac{3}{4}\right)x$

$\rightarrow 6$

$\rightarrow 3xy + 4xy^2 - 0.4xy - 10y + 0.4$

one term is allowed, and it is a constant

NOT Polynomials

$\rightarrow 4x^{-2} \rightarrow$ exponent is -2
(exponents can only be positive integers)

$\rightarrow \frac{2}{(x-2)}$ \rightarrow Dividing by a variable is not allowed

$\rightarrow \frac{1}{\sqrt{x}} \rightarrow$ the exponent is $\frac{1}{2}$