The Degree of a Polynomial
Preliminaries and Objectives

Preliminaries
- Exponents
- Variables

Objectives
- Polynomials
- Degree of a polynomial
Ingredients

Materials
- Real Numbers
- A variable “x”

Operations
- Addition
- Subtraction
- Multiplication
What We Get

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What We Get

4

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What We Get

\[ x^4 \]

The Degree of a Polynomial
What We Get

\[ 4x - 3(x - 4)(x - 3) = x^2 - 7x + 12 \]
What We Get

\[4\]

\[x\]

\[4x\]

\[4x - 3\]
What We Get

4

$x^2$

$x$

$4x$

$4x - 3$
What We Get

\[ 4 \quad x^2 \]

\[ x \quad \frac{1}{2} x^2 \]

\[ 4x \]

\[ 4x - 3 \]
What We Get

\[
\begin{align*}
4 & \quad x^2 \\
\frac{1}{2} & \quad \frac{1}{2}x^2 \\
\frac{1}{2} & \quad \frac{1}{2}x^2 + 4x - 3 \\
4x - 3 & \quad 4x - 3
\end{align*}
\]
What We Get

\[
\begin{align*}
4 & \quad x^2 \\
\frac{1}{2} x & \quad \frac{1}{2} x^2 \\
4x & \quad \frac{1}{2} x^2 + 4x - 3 \\
4x - 3 & \quad (x - 3)(x - 4) = x^2 - 7x + 12
\end{align*}
\]
Polynomials

The Degree of a Polynomial

\[ 6x^5 - 12x^4 + x^2 - 7 \]
Terms

**Term**

1. The product of a real number and $x$ raised to a positive integer power, OR
2. A lone real number (called the **constant**)

Polynomial

A polynomial is the sum of terms.
**Term**

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**Polynomial**

A polynomial is the sum of terms
Terms

**Term**

1. The product of a real number and $x$ raised to a positive integer power, OR
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**Polynomial**

A polynomial is the sum of terms

**Leading Term**

The term of a polynomial with the largest power of $x$
Degree of a Polynomial

The exponent of the leading term
Degree of a Polynomial

The exponent of the leading term

Examples

$6x^5 - 12x^4 + x^2 - 7$ has degree 5
Degree of a Polynomial

The exponent of the leading term

Examples

\[6x^5 - 12x^4 + x^2 - 7\] has degree 5

\[(x + 3)(x - 4)\] has degree 2 since \((x + 3)(x - 4) = x^2 - 2x - 12\)
Further Examples

Determine whether or not the given expression is a polynomial. If it is, find the degree.

\((3x^2 - 2)(4 - x)\)
\[\frac{x^2 - x - 1}{x + 3}\]
\[x^2 + x^{-2}\]
\[4\]
\[\frac{4}{3}\]
\[
\frac{x^2 - x - 1}{x + 3} \quad x + 3
\]
\[x^2 + x^{-2} \quad x^2 + x^4 - 3\]
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