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How Do You Find the Degree of a Monomial?

Definition: Degree of a Monomial

SUMMARY

Taking the sum means we'll add all the exponents of all the variables

$3y^3$ is a monomial with 1 variable: y^3

$7x^2y^3z$ is a monomial with 3 variables: x^2 , y^3 , and z

12 is a monomial with no variables

The degree of $3y^3$ is 3

The 'z' in $7x^2y^3z$ has an invisible exponent of 1

The degree of $7x^2y^3z$ is 6

The degree of 12 is 0

DEGREE OF A MONOMIAL:

Sum of **exponents** of **variables**

| MONOMIAL: | DEGREE: |
|--------------|-----------|
| $3y^3$ | 3 |
| $7x^2y^3z^1$ | $2+3+1=6$ |
| 12 | 0 |

NOTES

1) Definition

The **degree** of a monomial is equal to the sum of all the **exponents** of all the **variables** in the monomial

So to find the **degree**, find all the **variables** in the monomial and add their **exponents** together

Degree of a Polynomial (with one variable)

A **polynomial** looks like this:

$$2x^4 + 6x - 5$$

terms

example of a polynomial
this one has 3 terms

The **Degree** (for a polynomial with one variable, like x) is:

the **largest exponent** of that variable.

$$4x^3 + 2x^2 - 7$$

this makes it Degree 3

More Examples:

$4x$ The Degree is **1** (a variable without an exponent actually has an exponent of 1)

$4x^3 - x + 3$ The Degree is **3** (largest exponent of x)

$x^2 + 2x^5 - x$ The Degree is **5** (largest exponent of x)

$z^2 - z + 3$ The Degree is **2** (largest exponent of z)

Degree of a Polynomial with More Than One Variable

When a polynomial has more than one variable, we need to look at **each term**. Terms are separated by + or - signs:

$$\begin{array}{c} 4xy^2 + 3x - 5 \\ \hline \text{terms} \end{array}$$

example of a polynomial
with more than one variable

For **each term**:

- Find the degree by **adding the exponents of each variable** in it,

The **largest** such degree is the degree of the polynomial.

Example: what is the degree of this polynomial:

$$\begin{array}{c} 5xy^2 - 3x + 5y^3 - 3 \\ \hline \text{terms} \end{array}$$

Checking each term:

- **$5xy^2$** has a degree of **3** (x has an exponent of 1, y has 2, and $1+2=3$)
- **$3x$** has a degree of **1** (x has an exponent of 1)
- **$5y^3$** has a degree of **3** (y has an exponent of 3)
- **3** has a degree of 0 (no variable)

The largest degree of those is 3 (in fact two terms have a degree of 3), so the polynomial has a degree of **3**

Example: what is the degree of this polynomial:

$$4z^3 + 5y^2z^2 + 2yz$$

Checking each term:

- $4z^3$ has a degree of **3** (z has an exponent of 3)
- $5y^2z^2$ has a degree of **4** (y has an exponent of 2, z has 2, and $2+2=4$)
- $2yz$ has a degree of **2** (y has an exponent of 1, z has 1, and $1+1=2$)

The largest degree of those is 4, so the polynomial has a degree of **4**

Student Name: _____

Score: _____

Write the degree of polynomials

1. $8p^2qr + 3p^4q + 3qr^5$ _____

2. $9p + 12q^2 + 188pq^2 + 10q^{12}$ _____

3. $x^5 + 2x^3y + 3xy^3 + y^4 + 2$ _____

4. $x^4yz^2 + 5xyz^3 + 12x^3y^3z$ _____

5. $5u^5 + 11u^2vw + 13uv^2w^3 + 4u$ _____

6. $8a^2 + 13b^3$ _____

7. $12pqr$ _____

8. $4r^2st + 3s^3t + t^2$ _____

9. $7a^3 + 6a^2bc - 12bc^4$ _____

10. $6uvw^2 + 8uv^2w^3 + 13w^4$ _____

Name : _____

Degree of Monomials

Sheet 1

Write the degree of each monomial.

1) $-3a^4b$

2) $2u^3v^4w$

3) $4pqr$

4) $-x^2$

5) $6y$

6) $-9st^3$

7) $-gh^5$

8) 7

9) $8m^3n^6$

10) $-5x^3yz$

11) $-k^7$

12) cd

Defining and Naming Polynomials

EXAMPLE

The chart summarizes the kinds of polynomials.
The greatest power of a variable is called *the degree of a polynomial*.

| Expression | Name of the Polynomial | Degree |
|-----------------------|------------------------|--------|
| $2y^2$ | monomial | 2 |
| $2y^2 + 5$ | binomial | 2 |
| $2y^2 - 3y + 5$ | trinomial | 2 |
| $y^3 + 2y^2 - 3y + 5$ | polynomial | 3 |

Directions Fill in the missing data in the chart. Write on each numbered blank.

| Expression | Name of the Polynomial | Degree |
|----------------------|------------------------|-----------|
| $3n^2 + 2n$ | 1) _____ | 2 |
| $k^3 - 2k^2 + k - 4$ | polynomial | 2) _____ |
| $5x$ | monomial | 3) _____ |
| $3x^2$ | 4) _____ | 2 |
| $7y^2 + 4y - 5$ | trinomial | 5) _____ |
| $n^3 + n^2 - 8n - 8$ | 6) _____ | 7) _____ |
| $93n$ | 8) _____ | 1 |
| $11k^2 - 2k + 17$ | 9) _____ | 10) _____ |
| $b^2 + 4$ | 11) _____ | 12) _____ |

Directions Each expression is described incorrectly. Write what is wrong with the description.

13) $k + 5$ "binomial in k , degree 2" _____

14) $y^2 - 4$ "trinomial in y , degree 2" _____

15) $r^3 - r^2 - 3r + 7$ "polynomial in x , degree 3" _____

Student Name: _____

Score: _____

Write the degree of the polynomials

1. $7xy$ _____

2. $8x^3yz^2$ _____

3. $5xy^2$ _____

4. $3abc$ _____

5. $-2a^2bc$ _____

6. $-8pqr^4$ _____

7. $-2p^3q^2r^2$ _____

8. $12x$ _____

9. $34u^2v$ _____

10. $7r^5st^2$ _____