

Writing Polynomials in Standard Form

When giving a final answer, you must write the polynomial in standard form. Standard form means that you write the terms by descending degree. That may sound confusing, but it's actually quite simple. Here's what to do:

- 1) Write the term with the highest exponent first
- 2) Write the terms with lower exponents in descending order
- 3) Remember that a variable with no exponent has an understood exponent of 1
- 4) A constant term (a number with no variable) always goes last.

Here's a few examples:

1) $6y^3+4y^5-2y^2-6y+8y^4+7$

The highest exponent is the 5, so that entire term must be written first: $4y^5$

The next highest exponent is the 4 so that term comes next. So far we have $4y^5+8y^4$

The next highest exponent is the 3 so add that term to get

$$4y^5 + 8y^4 + 6y^3$$

Then comes 2. Notice that this term is negative, so don't forget to include the negative sign:

$$4y^5 + 8y^4 + 6y^3 - 2y^2$$

Remember that term has an understood exponent of 1 so it comes next. $4y^5+8y^4+6y^3-2y^2-6y$

The constant term (a number with no variable) always comes last so the final answer is:

$$4y^5+8y^4+6y^3-2y^2-6y+7$$

2) $9y^2+5y-3y^8$

Often, the polynomial does not contain all of the exponents. You still follow the same procedure listing the highest exponent first (8) then the next (2) and finally the term with just a variable (understood exponent of 1). Notice that the negative sign stayed with the three)

Answer: $-3y^8+9y^2+5y$

3) $6-2y$

The $-2y$ has an understood exponent of one so it would come first. Numbers by themselves (constants) always come last.

Answer: $-2y+6$

Practice: Write the following polynomials in standard form.

1) $8y^3-4y+y^2-3$

2) $3x^2-4x^3-2x$

3) $6-4y$

4) $4a+6a^2+5a^3$

5) n^3-5n^5+8

Review

Write the following polynomials in standard form and then identify its degree:

1. $4x^2 + 5x^3 + x - 1$

2. $9 + 3y^2 - 2y$

3. $8 + 3y^3 + 8y + 9y^2$

4. $y + 6y^4 - 2y^3 + y^2$

5. $-16y^6 - 18$

6. $3x + 2x^2 + 9y + 8$

7. $8y^4 + y - 7y^3 - 3y^2$

8. $-3 + 8x^2 - 2x^3 - x$

9. $9 - 3y^2 - 2y^3 + 2y$

10. $14 + 6x^2 - 2x - 8y$

11. $4x + 3x^2 - 5x^3 + 8x^4$

12. $-8 + 3y^2 - 2y^3 + y$

13. $9 + 8y^2 + 2y^3 - 8y$

14. $m^4 - 12m^7 + 6m^5 - 6m - 8$

Classifying Polynomials

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Name each polynomial by degree and number of terms.

1) $-3x^5 - 10x^4 - x^3 + 4x$

2) $7n - 4$

3) $-5p^4$

4) $-10k^2 - 10$

5) $-9m^2 - m$

6) $8x^6 + 2x + 5$

7) k^5

8) $-r$

Write in Standard Form. Then name each polynomial by degree and number of terms.

9) $-10p^2$

10) $7m^2 - m + 8m^4 + 6m^3$

11) $10b^3$

12) $-8x^4 + 2x^3 + 9x^5$

13) $-6x^4 - 5x - 9x^3$

14) $-3n$

15) 10

16) $4a^2$

17) $10 - 10x$

18) $10 - 5n^3$

19) 2

20) $10x^5 - 8x^3$