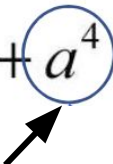# Worksheet: Simplifying Polynomials by Combining Like Terms

Why is this skill important? On the GED math test, numerous questions require the ability to simplify polynomials. This includes things like solving equations and inequalities.

NOTE: *These are tricky problems. Make sure you do the flashcard on the basics of simplifying polynomials in the **MathOtter** app before trying these.*

$$a^5 - 8 - 9a^5 + \boxed{a^4} - 7a + 5 + a^3$$

In this example polynomial, each number, variable, or variable with a coefficient that is separated by an addition or subtraction operator is called a "term".

"Like" terms are:
- The same variable raised to the same power (with or without a coefficient)
- Plain numbers

So, in this example, -8 and +5 are like terms. We combine like terms to simplify polynomials. These can be combined: - 8 + 5 = - 3

Also, the variable terms a^5 and $-9a^5$ are like terms. These can be combined: $a^5 - 9a^5 = -8a^5$

No other terms are like terms, so the simplified polynomial is:

$$-8a^5 + a^4 + a^3 -7a - 3$$

Note that in a simplified polynomial, there are some rules to writing the answer:
- Highest order exponents go first, the rest in descending order
- Variables in alphabetical order
- Plain numbers last

Sample problems:
Simplify each of these polynomials (answers on next page)

1. $-8 + 9x^4 + x - 12x^2 + 5 +2x^2$
2. $10xy + y^2 - 5x^2 - 9 +2xy - 8y^2$
3. $a - 7a + 3 + 2a$
4. $- 4xy + x + y + 5$
5. $- 2bc + bc^2 + 6bc + 7ab$
6. $- 4 + g^2 - g^2h + 7g^2 +h^2 - 1$
7. $9y + y - y^2 - y$
8. $22x^2 - xy + 5 - 11x^2 + 7xy + 2$
9. $4a^2b + 4ab + 5ab + 2a^2b$
10. $89 - y^6 + 2y^4 - 3 + 7y^6 - 1$
11. $3c + c$
12. $gm^3 + c^4 - 10 + 5gm^3 + c$
13. $9x^2y - 2xy^2 + 1 x^2y - 2xy^2$
14. $12y - 12y - 9$
15. $2n - 2$

Answers:

1. $9x^4 - 10x^2 + x - 3$
2. $-5x^2 - 7y^2 + 12xy - 9$
3. $-4a + 3$
4. $-4xy + x + y + 5$
5. $bc^2 + 7ab + 4bc$
6. $8g^2 - g^2h + h^2 - 5$
7. $-y^2 + 9y$
8. $11x^2 + 6xy + 7$
9. $6a^2b + 9ab$
10. $6y^6 + 2y^4 + 85$
11. $4c$
12. $c^4 + 6gm^3 + c - 10$
13. $10x^2y - 4xy^2$
14. -9
15. $2n - 2$