

Write the definitions for each of the following terms.

1. Polynomial - a mathematical expression involving the sum of powers in 1 or more variables multiplied by coefficients.
2. Coefficient - any number being multiplied by a power within a polynomial expression
3. Term - each product in a polynomial expression
4. Degree of a term - the exponent of a term in a polynomial
5. Degree of a polynomial - the degree of the term with the greatest exponent
6. Monomial - a polynomial with only 1 term
7. Binomial - a polynomial with exactly 2 terms
8. Trinomial - a polynomial with exactly 3 terms
9. Describe the **standard** form of a polynomial.
 $ax^2 + bx + c$, where $a \neq 0$ and the terms are alphabetized in order from highest to lowest exponent.
10. Describe the **factored** form of a polynomial.
 $a(x - r_1)(x - r_2)$, where $a \neq 0$ and r_1 and r_2 are the x -coordinates of the solution, written as $(r_1, 0)$ and $(r_2, 0)$

Write each polynomial in standard form. Classify the polynomial as a monomial, binomial, or trinomial. Find the degree of the polynomial.

11. $15x^3 - 9x^4 + 11x^2$
Standard Form: $-9x^4 + 15x^3 + 11x^2$
of Terms: trinomial (3)
Degree: 4

12. $8 - 9y^2$
Standard Form: $-9y^2 + 8$
of Terms: binomial (2)
Degree: 2

13. $-22z^5$
Standard Form: $-22z^5$
of Terms: monomial (1)
Degree: 5

14. $9 + 5a^2 - 8a$
Standard Form: $5a^2 - 8a + 9$
of Terms: trinomial (3)
Degree: 2

Find the sum or difference of each polynomial. Write your answer in standard form.

15. $(5k^2 - 8k + 1) + (6k^2 + 4k + 8)$

$$\begin{array}{r} 5k^2 - 8k + 1 \\ + 6k^2 + 4k + 8 \\ \hline 11k^2 - 4k + 9 \end{array}$$

16. $(13a^4 - 9a^3 + 2a - 7) + (7a^4 + 8a^3 - 2a^2 - 3)$

$$\begin{array}{r} 13a^4 - 9a^3 + 0 + 2a - 7 \\ + 7a^4 + 8a^3 - 2a^2 + 0 - 3 \\ \hline 20a^4 - a^3 - 2a^2 + 2a - 10 \end{array}$$

17. $(14w^2 - 2w + 8) - (11w^2 + 6w - 3)$

$$\begin{array}{r} 14w^2 - 2w + 8 \\ + -11w^2 - 6w + 3 \\ \hline 3w^2 - 8w + 11 \end{array}$$

18. $(2j^2 + 9j - 5) - (6j^3 + 5j^2 - 4j + 8)$

$$\begin{array}{r} 0 + 2j^2 + 9j - 5 \\ + -6j^3 - 5j^2 + 4j - 8 \\ \hline -6j^3 - 3j^2 + 13j - 13 \end{array}$$

Find the product of each polynomial. Write your answer in standard form.

19. $5a^2(10a^2 - 6a - 7)$

$$50a^4 - 30a^3 - 35a^2$$

20. $(x+5)(2x-9)$

$$\begin{array}{r} x(2x-9) + 5(2x-9) \\ 2x^2 - 9x + 10x - 45 \\ \hline 2x^2 + x - 45 \end{array}$$

21. $(3x+2)(-2x-6)$

	$-2x$	-6
$3x$	$-6x^2$	$-18x$
$+2$	$-4x$	-12

$$-6x^2 - 22x - 12$$

22. $(3m^2+3)(2m^3+4m^2-6m-8)$

	$2m^3$	$+4m^2$	$-6m$	-8
$3m^2$	$6m^4$	$+12m^3$	$-18m^2$	$-24m$
$+3$	$+6m^3$	$+12m^2$	$-18m$	-24

$$6m^4 + 18m^3 - 6m^2 - 42m - 24$$