Algebra I Unit 3: Polynomials

1. What disqualifies $-2x^2y + 5x^{-1}y + 3y - 4$ from being a multivariate polynomial?

(A) The leading coefficient is negative.
(B) The exponent of x in the second term is negative.
(C) The third term only has one variable.
(D) The fourth term is negative.

2. What is the degree of the polynomial $5x^2y^2 - 2x^3 + 9x$?

(A) 2
(B) 3
(C) 4
(D) 5

3. Which of the following illustrates polynomials being closed under addition?

(A) $(2x - 3^x) + (2x + 3)$
(B) $(2x - x^3) + (2x + 3)$
(C) $(x^2 + x^3) - (2x - 3)$
(D) $(2x^{-1} + x^3) + (2x + 3)$

4. If polynomials are closed under addition and subtraction, when will adding or subtracting polynomial expressions yield another polynomial?

(A) Always
(B) Sometimes
(C) Never
(D) More information needed

5. If we want to use the expression $(2x^a + 3y)(x^3 - y)$ to show that polynomials are closed under multiplication, what could be a possible value of a?

(A) 77
(B) x
(C) -7
(D) $\frac{1}{2}$

6. What's the degree of the polynomial $6x^3 + 4x^2 - 6x + 10$?

(A) 6
(B) 5
(C) 3
(D) 2

7. What's the product of $(6x)(4x^3)$?

(A) $24x^3$
(B) $24x^4$
(C) $24x^3 + 6x^4$
(D) $6x^3$

8. What are the correct values for a and b in the following?
$$3x^2(4x^3 + 2x)$$
$$(3x^2)(4x^3) + (3x^2)(2x)$$
$$12x^a + 6x^b$$

(A) $a = 6$ and $b = 2$
(B) $a = 5$ and $b = 2$
(C) $a = 5$ and $b = 3$
(D) $a = 6$ and $b = 3$

9. Which of the following is **not** a feature of a polynomial?

(A) A collection of monomials
(B) All terms have non-negative, whole number exponents
(C) Terms can have variables in the exponents
(D) Terms are monomials with non-zero coefficients

10. Let n equal any even integer. Which of the following polynomials represents the product of n and twice the next consecutive even integer?

(A) $2n^2 + 4n$
(B) $2n^2 + n$
(C) $2n^2 + 2n$
(D) $2n^2$

11. What's the value of $3x^2 + 4x + 5$ if $x = -2$?

(A) 33
(B) 9
(C) -15
(D) 25

12. Which of the following is **not** true regarding the roots of $f(x) = (x - 3)(x - 2)$?

(A) $f(3) = 0$
(B) $f(0) = 3$
(C) The y-values of the roots equal 0.
(D) The polynomial's graph crosses the x-axis at the roots

13. What's the sum of xy^3 and x^3y?

(A) 1
(B) $2x^3y^3$
(C) $x^4 + y^4$
(D) None of these

14. Which expression is equivalent to $(x^2 + 3x - 7) + (2x^2 - x + 10)$?

(A) $x^2 + 2x + 17$
(B) $3x^2 + 2x + 3$
(C) $3x^2 + 4x + 17$
(D) $x^2 + 2x + 3$

15. What is the product of $(x + 1)(x + 2)(x + 3)$?

(A) $x^3 + 6$
(B) $x^3 + 6x^2 + 11x + 6$
(C) $x + 4$
(D) $x^3 + 9x + 18x + 6$

16. What's $3x^2 + 9x + 6$ in factored form?

(A) $(3x + 6)(x + 1)$
(B) $3(x + 6)(x + 1)$
(C) $3(x + 1)(x + 2)$
(D) $(3x + 1)(x + 2)$

17. Which of these expressions can be factored as a perfect square?

(A) $x^2 + 12x + 36$
(B) $x^2 + 6x + 36$
(C) $x^2 + 4x + 16$
(D) $x^2 + x + 25$

18. Which of the following is **not** a difference of two squares?

(A) $4x^2 - 25y^2$
(B) $2x^2 - 9$
(C) $x^2 - 16y^2$
(D) $9a^2 - b^2$

19. If you factor the polynomial $2x^2 - 8x + 3x - 12$ by grouping, what factors would you get?

(A) $(2x + 3)(x + 4)$
(B) $(x + 2)(2x - 6)$
(C) $(2x + 3)(x - 4)$
(D) $(x + 2)(x - 6)$