P5: Algebraic Expressions

1. The expression $(2\sqrt{x}+y)(2\sqrt{x}-y)+(2-y)^2$ simplifies to

   A) $4x-4y+4$

   B) $4x^2-4y+4$

   C) $4x-4y-4$

   D) $2y^2+4x-4y+4$

   E) $4x+4y+4$

2. The sum of all the coefficients of the polynomial $(x^2-2)^3-(x^6+8)$ is

   A) -10

   B) -6

   C) 22

   D) 6

   E) 2

3. If $x^2 + \frac{1}{x^2} = 3$, then $\left(x - \frac{1}{x}\right)^2 =$

A) 1

B) -1

C) -4

D) 4

E) 9

4. The coefficient of xy^2 in the expansion of the expression $x(2x - y)(y + 2x) - (x + y^2)^2$ is:

A) -3

B) 1

C) - 2

D) -4

E) 2

5. $\left(1+\frac{x}{y}\right)^2-\left(1-\frac{x}{y}\right)^2=?$

A) $\frac{4x}{y}$

B) $\frac{2x}{y}$

C) $-\frac{4x}{y}$

D) $\frac{x}{y}$

E) $-\frac{x}{y}$

6. When simplified, the expression $8x^3-6x^2-1-(2x-1)^3$, is

A) a binomial of degree 2

B) a binomial of degree 1

C) a trinomial of degree 2

D) a monomial of degree 2

E) a monomial of degree

7. If the coefficient of xy in the product $(Mx + y)^2 \left(x - 1 - \frac{x}{y}\right)$ is -7, then $M =$

A) 3

B) 9

C) $-\frac{7}{2}$

D) $\frac{7}{2}$

E) -3

8. Which one of the following is NOT a polynomial?

A) $x^3 - 4x^2 + 2\sqrt{x}$

B) $x^3 - 3x^2 + \sqrt{5}x$

C) $\sqrt{3}x^4 - \sqrt{5}x^2 - 1$

D) $x^2 - 4^{-1}x + \sqrt{12}$

E) $-\frac{1}{3}$

9. The expression $(a^2 + b^2)^2 - (a^2 - b^2)^2$ simplifies to

A) $4a^2b^2$

B) $2a^2b^2$

C) $2a^2$

D) $4a^4b^4$

E) $2a^4b^4$

10. The expression $\left(x + 2 + \sqrt{x^2 + 2}\right)\left(x + 2 - \sqrt{x^2 + 2}\right)$, is

A) a binomial of degree 1.

B) a trinomial of degree 2.

C) a binomial of degree 2.

D) a trinomial of degree 4.

E) a binomial of degree 4.

11.The coefficient of x^2y in the expression $(x^2-2y)^2-(x-y)^3$, is

A) -1

B) 2

C) -2

D) 1

E) -3

12.Which one of the following is a polynomial?

A) $5x^4+x+\sqrt{2}$

B) $\frac{x+3}{3x^2+x+1}$

C) $x^2+3x+2x^{-2}$

D) $\sqrt{x^2+x+4}$

E) $2x^2-x+\sqrt{x}$

13.The degree of the polynomial $(xy^2 - 1)^3(2x + 1)^2$ is

A) 11

B) 10

C) 9

D) 6

E) 5

14.If A is the leading coefficient and B is the coefficient of x in the polynomial $P(x) = (2x - 3)^3 - (3x - 2)^2$ then $A + B =$

A) 74

B) 82

C) 64

D) 38

E) 56

15. If the coefficient of x^3 in the product $(x^4 + x^3 - kx^2 + x - 5)(3x^2 - 4x + k)$ is 18, then k is equal to:

A) 3

B) -2

C) -5

D) 2

E) 1

16. The sum of the coefficients of x^2y and xy^2 in the expression $(2x - 3y)^3$ is

A) 18

B) -80

C) -18

D) -36

E) 80

17. If $x + \frac{1}{x} = 3$, then by using the expansion of $\left(x + \frac{1}{x}\right)^3$, the value of $x^3 + \frac{1}{x^3}$ is equal to

A) 18

B) 27

C) 36

D) 0

E) 3

18. If the coefficient of x^3 in the product $(x^4 + x^3 - kx^2 + x - 5)(3x^2 - 4x + k)$ is 18, then k is equal to:

A) 3

B) -2

C) -5

D) 2

E) 1

19. When simplified, the expression $3y^2\left(3x-\frac{2}{3}\right)\left(x+\frac{2}{9}\right)$ is a

A) binomial of degree 4

B) trinomial of degree 6

C) trinomial of degree 4

D) binomial of degree 2

E) monomial of degree 2

20.The coefficient of x^3 in the product $2x(3x-2)^3$ is equal to

A) -108

B) -54

C) 54

D) 72

E) 27

21. The coefficient of x^2 in the product of $(2x^2 - 3x + 2)(-x^2 + 4x - 3)$ is

A) -20

B) -8

C) -16

D) 8

E) 22

22. If $(2x + 3)(2x - 3) - (3x - 2)^2 = ax^2 + bx + c$, then $a + b + c =$

A) -10

B) -6

23.The coefficient of x^4 in the expression $(2-x^2)^3-(2+x^2)(2-x^2)$, is

A)7

24.The coefficient of x in the expression $x(2x-1)(2x+1)-(x-2)^3$ is

A) -11

B) -13

25.If $(A+1)(A^2+1)=3$, then $A^4-1=$

A) 3

B) -3

C) $3A-1$

D) $A-3$

E) $3A-3$

26.When simplified, the expression $(3x-1)^3-27x\left(x^2-x+\frac{1}{3}\right)$ is

A) a monomial of degree 0

B) a binomial of degree 1

C) a binomial of degree 2

D) a trinomial of degree 3

E) a monomial of degree 1

27. If the coefficient of xy in the product $(x-y)(x+y)-(Mx+y)^2$ is 8, then $M=$

A) 4

B) -4

C) -2

D) 8

E) -8

28. Which one of the following is NOT a polynomial of degree 2?

A) $x^2+2|x|+1$

B) $(x-2)(x+2)$

C) $(x-1)^2+x^2$

D) πx^2+ex

E) $x^2-4^{-1}x+\sqrt{5}$

29. If $(k+b)x+2x^2=2(x+k)^2$, then $x=$

A) $\frac{2b^2}{3b+k}$

B) $k-2b$

C) $\frac{2k^2}{b+3k}$

D) $\frac{2k^2}{b-3k}$

E) $\frac{2b^2}{3b-k}$