

Basic Polynomial Operations

Name each polynomial by degree and number of terms.

1) $-10x$

2) $-10r^4 - 8r^2$

3) 7

4) $9a^6 + 3a^5 - 4a^4 - 3a^2 + 9$

5) $-3n^3 + n^2 - 10n + 9$

6) $7x^2 - 9x - 10$

7) $-4b$

8) $-9 + 7n^3 - n^2$

9) Critical thinking: Why is it impossible to have a linear trinomial with one variable?

Simplify each expression.

10) $(4m^4 - m^2) + (5m^2 + m^4)$

11) $(5x + x^4) - (3x^4 + 4x)$

12) $(5 + 7x^3 + 3x^2) + (-12 + 5x + 6x^2)$

13) $(4 + 3x^2 + 8x^3) + (-7x^3 + 12x^5 + 6x^2)$

$$14) (13m^4 + 2) + (m^4n^2 + 2 - 2m^4) - (-13m^2n^3 + 5m^4)$$

$$15) (-10mn^3 - 4n^4) - (-2n^4 - 7mn^3 - 6n^3) - (5n^3 + 6mn^3)$$

Find each product.

$$16) (2n + 3)(n - 2)$$

$$17) (5v - 1)(4v + 3)$$

$$18) (2r - 2)(-r - 7)$$

$$19) (3x + 5)(3x - 6)$$

$$20) (-4x^2 - 5x - 1)(4x^2 - 6x - 2)$$

$$21) (x^2 - 2x - 8)(-x^2 + 3x - 5)$$

$$22) (-4m - 4n)(-6m - 6n)$$

$$23) (8u + 4v)(6u + 6v)$$

Critical thinking questions:

$$24) \text{Simplify: } (a + b)(c + d)$$

$$25) \text{Simplify and then classify by degree and number of terms: } 2x + 3x^2(4x - 5)$$

Basic Polynomial Operations

Name each polynomial by degree and number of terms.

1) $-10x$

linear monomial

2) $-10r^4 - 8r^2$

quartic binomial

3) 7

constant monomial

4) $9a^6 + 3a^5 - 4a^4 - 3a^2 + 9$

sixth degree polynomial with five terms

5) $-3n^3 + n^2 - 10n + 9$

cubic polynomial with four terms

6) $7x^2 - 9x - 10$

quadratic trinomial

7) $-4b$

linear monomial

8) $-9 + 7n^3 - n^2$

cubic trinomial

9) Critical thinking: Why is it impossible to have a linear trinomial with one variable?

It could have at most two terms: Linear and constant.

Simplify each expression.

10) $(4m^4 - m^2) + (5m^2 + m^4)$

$5m^4 + 4m^2$

11) $(5x + x^4) - (3x^4 + 4x)$

$-2x^4 + x$

12) $(5 + 7x^3 + 3x^2) + (-12 + 5x + 6x^2)$

$7x^3 + 9x^2 + 5x - 7$

13) $(4 + 3x^2 + 8x^3) + (-7x^3 + 12x^5 + 6x^2)$

$12x^5 + x^3 + 9x^2 + 4$

$$14) (13m^4 + 2) + (m^4n^2 + 2 - 2m^4) - (-13m^2n^3 + 5m^4)$$

$$m^4n^2 + 13m^2n^3 + 6m^4 + 4$$

$$15) (-10mn^3 - 4n^4) - (-2n^4 - 7mn^3 - 6n^3) - (5n^3 + 6mn^3)$$

$$-9mn^3 - 2n^4 + n^3$$

Find each product.

$$16) (2n + 3)(n - 2)$$

$$2n^2 - n - 6$$

$$17) (5v - 1)(4v + 3)$$

$$20v^2 + 11v - 3$$

$$18) (2r - 2)(-r - 7)$$

$$-2r^2 - 12r + 14$$

$$19) (3x + 5)(3x - 6)$$

$$9x^2 - 3x - 30$$

$$20) (-4x^2 - 5x - 1)(4x^2 - 6x - 2)$$

$$-16x^4 + 4x^3 + 34x^2 + 16x + 2$$

$$21) (x^2 - 2x - 8)(-x^2 + 3x - 5)$$

$$-x^4 + 5x^3 - 3x^2 - 14x + 40$$

$$22) (-4m - 4n)(-6m - 6n)$$

$$24m^2 + 48mn + 24n^2$$

$$23) (8u + 4v)(6u + 6v)$$

$$48u^2 + 72uv + 24v^2$$

Critical thinking questions:

$$24) \text{Simplify: } (a + b)(c + d)$$

$$ac + ad + bc + bd$$

$$25) \text{Simplify and then classify by degree and number of terms:}$$

$$2x + 3x^2(4x - 5)$$

$$12x^3 - 15x^2 + 2x; \text{Cubic trinomial}$$

Problems

Multiply, simplify, and write your answers in descending order.

1) $(2xy)(-3xy^3)$

9) $(8x^3 + 1)(-x^3 - 3)$

2) $x^2(x^3 + 2x^2 - 5)$

10) $(4x + 1)(4x - 1)$

3) $-3y(-y^3 - 2x + 1)$

11) $(3x + 2)^2$

4) $(6x^5)(2x^4)$

12) $(y + \frac{1}{2})(y - \frac{1}{2})$

5) $(x + 2)(x - 1)$

13) $(y - \frac{1}{2})^2$

6) $(x + 2)(x - 2)$

14) $(xy^2 - 4z)(xy^2 + 4z)$

7) $(3x^2 - x + 2)(x - 2x^2)$

15) $(4x + y)(x^2 - x - y)$

8) $(y^2 + 2y + 3)(y^2 - 2y - 3)$

Answers:

1) $-6x^2y^4$

9) $-8x^6 - 25x^3 - 3$

2) $x^5 + 2x^4 - 5x^2$

10) $16x^2 - 1$

3) $3y^4 + 6xy - 3y$

11) $9x^2 + 12x + 4$

4) $12x^9$

12) $y^2 - \frac{1}{4}$

5) $x^2 + x - 2$

13) $y^2 - y + \frac{1}{4}$

6) $x^2 - 4$

14) $x^2y^4 - 16z^2$

7) $-6x^4 + 5x^3 - 5x^2 + 2x$

15) $4x^3 + x^2y - 4x^2 - 5xy - y^2$

8) $y^4 - 4y^2 - 12y - 9$