

# CHAPTER 10

## ALGEBRAIC EXPRESSIONS

### More Questions for Practice

- Identify the variables and the constants in the following algebraic terms:  
(a)  $-7x^2$                       (b)  $9ab$                       (c)  $0.2x^2y$                       (d)  $-15p^5q^2r$
- Identify the variable terms and the constant term in the following algebraic expressions:  
(a)  $9p^2 - 2q^2 + pq$     (b)  $4 - a^2$                       (c)  $11x^2 - 5b^2 - 4$   
(d)  $\frac{1}{4}x^2 + \frac{2}{3}y^2 + xy - 3$                       (e)  $p^3 + q^2 + pq - 12$
- Name the algebraic expressions according to the number of terms present in the expression:  
(a)  $-12x^2yz$                       (b)  $4x^2 - 1$                       (c)  $5x^3y^2 - 4x^2y + 49$   
(d)  $9x^2 - 4y^2$                       (e)  $4pq^2r$                       (f)  $17x^2 + 14xy + 9$
- Write the coefficients of the given factors in the following monomials:  
(a) Coefficient of  $x^2y$  in  $-7x^2yp$                       (b) Coefficient of  $pqr$  in  $\frac{1}{4}pqr$   
(c) Coefficient of  $mn$  in  $\frac{-3}{2}m^2n^2$                       (d) Coefficient of  $4p$  in  $20p^2q$   
(e) Coefficient of  $ab$  in  $-ab$
- Point out the like terms from the following collection of terms:  
(a)  $-p, -q, -p^2, 4p, 0.6p$                       (b)  $4x^2yz, -3xyz, 9xzy, -2x^2yz^2, -11xyz$   
(c)  $-\frac{1}{4}p^2q^2, 11q^2p^2, 9p^2q, 5q^2p, -\frac{3}{9}p^2q^2$                       (d)  $3abc, -4bca, 2b^2ca, -5bc^2a, -\frac{1}{2}cab$   
(e)  $-9pr, 4pq, \frac{1}{11}rp, \frac{1}{11}qr, pr$
- Identify the degree of the following polynomials:  
(a)  $4x^2 - 9$                       (b)  $5x^3 - 3x^2 + 2x - 9$                       (c)  $p^2 - q^2$   
(d)  $a^2 - 2abc + b^2$                       (e)  $p^2qr + p^3 + q^3 + r^3 - q^2pr$
- Add the following algebraic expressions:  
(a)  $4x^2y^2 - 3xy + 7x^2y, -5x^2y^2 + 9xy - x^2y$  and  $x^2y^2 + xy - 3x^2y$   
(b)  $7a^2b + 3a^2c - b^2c^2 + 1, -4a^2b - 4a^2c + 5$  and  $-3a^2b - a^2c + 3b^2c^2 - 4$
- Subtract:  
(a)  $m^3 - 3n^3 - 4mn^2 - m^2n$  from  $4mn^2 + n^3 - 9m^2n$   
(b)  $p^4 - 1 + p - p^2$  from  $1 - p + p^5 - p^4 - p^3$   
(c)  $5x^3y + 11xy^3 - x^4 - 6y^4 - 3x^2y^2$  from  $8xy^3 + 2x^3y - 5y^4$
- What is the excess of  $4p^3 - 3p^2q - 9pq^2 + 6q^3$  over  $5p^3 + 6p^2q - 3pq^2 - 8q^3$ ?

10. By how much must  $\frac{5}{12}a^2 + \frac{2}{3}ab$  be increased to get  $a^2 + ab$ ?
11. By how much must the sum of  $m^4 - 2m^3n + m^2n^2$  and  $m^3n + 2m^2n^2 - mn^3$  be increased to get  $m^4 - 2m^2n^2 - n^4$ ?
12. Simplify by removing brackets and grouping like terms:
- (a)  $3ab^3 - (4a^2 + 3b^2) + (-4ab^3 + 9a^2 - 3b^2)$   
 (b)  $3x - 4y - (2z - 4x - 2y) - (5x - 3y + z) + (2x + y - 8z)$
13. Simplify:  
 $1 - p - (1 - \overline{p + p^2}) - \{1 - (p - \overline{p^2 + p^3})\} - [1 - \{p - (p^2 - \overline{p^3 + p^4})\}]$
14. Add the expressions in each of the following:
- (a)  $-2m^3 + 2m^2n - 2mn^2 - n^3$ ,  $-3m^2n + n^3$  and  $-4m^2n + 6mn^2$   
 (b)  $3ab^2 - 2b^3 + a^3$ ,  $5a^2b - ab^2 - 3a^3$ ,  $8a^3 + 5b^3$  and  $9a^2b - 2a^3 + ab^2$
15. Simplify:
- (a)  $m^2 + n^2 - [m^2 + n^2 - \{m^2 + n^2 - (m^2 + n^2 - \overline{m^2 + n^2})\}]$   
 (b)  $x - [y - z + x - \{y - (x - y - \overline{z + x - y} + z)\}]$
16. What should be subtracted from  $x - 1$  to get  $1 + x - x^2$ ?

## ANSWERS

1. (a)  $x$  is the variable and  $-7$  is constant. (b)  $a$  and  $b$  are variables and  $9$  is constant.  
 (c)  $x$  and  $y$  are variables and  $0.2$  is constant. (d)  $p, q, r$  are variables and  $-15$  is constant.
2. (a) Variable terms are  $9p^2, -2q^2, pq$  and constant term is none.  
 (b) Variable term is  $-a^2$  and constant term is  $4$ .  
 (c) Variable terms are  $11x^2, -5b^2$  and constant term is  $-4$ .  
 (d) Variable terms are  $\frac{1}{4}x^2, \frac{2}{3}y^2, xy$  and constant term is  $-3$ .  
 (e) Variable terms are  $p^3, q^2, pq$  and constant term is  $-12$ .
3. (a) Monomial (b) Binomial (c) Trinomial  
 (d) Binomial (e) Monomial (f) Trinomial
4. (a)  $-7p$  (b)  $\frac{1}{4}$  (c)  $\frac{-3}{2}mn$  (d)  $5pq$  (e)  $-1$
5. (a)  $-p, 4p, 0.6p$  (b)  $-3xyz, 9xzy, -11xyz$  (c)  $-\frac{1}{4}p^2q^2, 11q^2p^2, -\frac{3}{9}p^2q^2$   
 (d)  $3abc, -4bca, -\frac{1}{2}cab$  (e)  $-9pr, \frac{1}{11}rp, pr$
6. (a)  $2$  (b)  $3$  (c)  $2$  (d)  $3$  (e)  $4$

7. (a)  $3x^2y + 7xy$  (b)  $-2a^2c + 2b^2c^2 + 2$
8. (a)  $4n^3 + 8mn^2 - 8m^2n - m^3$  (b)  $p^5 - 2p^4 - p^3 + p^2 - 2p + 2$  (c)  $y^4 - 3xy^3 - 3x^3y + 3x^2y^2 + x^4$
9.  $-p^3 - 9p^2q - 6pq^2 + 14q^3$  10.  $\frac{7}{12}a^2 + \frac{1}{3}ab$  11.  $-n^4 + mn^3 + m^3n - 5m^2n^2$
12. (a)  $-ab^3 + 5a^2 - 6b^2$  (b)  $4x + 2y - 11z$  13.  $p^4 - p^2 + 2p - 2$
14. (a)  $-2m^3 - 5m^2n + 4mn^2$  (b)  $4a^3 + 14a^2b + 3ab^2 + 3b^3$  15. (a)  $m^2 + n^2$  (b)  $z$
16.  $x^2 - 2$ .

  
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