

Chap. 9 ALGEBRAIC EXPRESSIONS AND IDENTITIES

1. Multiply the following.

(i) $11x^2y$ and $2x^2y^2$ (ii) $3y^2$ and $7y^5$ (iii) $5x^3$ and $4x^6$ (iv) $-9xy$ and $4x^2z$

2. Find the products of.

(i) $(-2xy^2)(5y)(-3z^2)$ (ii) $(ab)(bc)(ca)$

(iii) $(6a^2b)(-2b^2c)(3ac^2)$ (iv) $\left(\frac{5}{9}ab\right)\left(\frac{9}{7}bc\right)\left(\frac{-7}{5}ca\right)$

3. Find the value of $(3p^2q) \times (8q^3)$, when $p = 1$ and $q = -\frac{1}{4}$.

4. Find the value of $(-8x^2y^3) \times \left(\frac{1}{5}xy^2\right)$, when $x = -1$ and $y = 2$.

5. Find the product of $(3a^2b^3)$, $(-7a^2)$ and $(5a^2b^2)$, and then verify the result for $a = 2$ and $b = 3$.

6. Find the product of $\left(-\frac{3}{4}xy^2z\right)$ and $(-2z^2)$, then verify the result for $x = 1$, $y = 2$ and $z = 3$.

7. Verify $a^2b^2c^2 = (ab) \times (bc) \times (ca)$, for $a = 3$ and $b = 4$.

8. Find the product and then verify the following for $a = 2$ and $b = -5$.

(i) $a(a^2 - ab^2)$

(ii) $\frac{2}{7}a\left(ab - \frac{7}{6}ab^2\right)$

9. Find the product of the following.

(i) $2x(3x + y^2)$

(ii) $(-3y)(x^2 + 3xy)$

(iii) $3a^2(4a - 5a^2)$

(iv) $-8a^2b(-3a^2 - 2b)$

(v) $\frac{-5}{9}abc\left(\frac{18}{15}a^2bc - \frac{3}{10}abc^2\right)$

(vi) $7a(0.1a^2 - 0.5b)$

10. Multiply $\frac{5}{9}y^2z$, $\frac{7}{10}x^2$ and $(-3xz^2)$, and then verify the result for $x = \frac{1}{2}$, $y = \frac{1}{3}$ and $z = \frac{1}{4}$.

11. Find the following products and verify the results for $x = -1$ and $y = -2$.

(i) $(3x^2 + 2y^2)(x + y)$

(ii) $(x^2 - y^2)(x^2 + y^2)$

(iii) $\left(3x^2 + \frac{1}{3}y^2\right)(2y - 3x^2)$

(iv) $(x^4 - y^4)(x + y)$

(v) $\left(\frac{1}{2}x - y\right)\left(\frac{3}{5}x + y\right)$

(vi) $(0.7x - 0.6y)(2.3x - 2y)$

12. Find the products of the following.

(i) $(3x - 2)(5x^2 + 6x + 2)$

(ii) $(x^2 + y^2 + z^2)(xy + yz)$

(iii) $(x + y)(x^2 - xy + y^2)$

(iv) $(5x^2 + y)(3x + 2y)$

(v) $(x^3 + y^3)(x^2 - xy + y^2)$

(vi) $\left(\frac{3}{5}x^2 - 3y + 2\right)\left(\frac{1}{3}x - y\right)$

13. Simplify.

(i) $(3y + 2)(y - 2) - (7y + 3)(y - 4)$

(ii) $(2x - 3y)(x + y) - (5x + 2y)(x - y)$

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

(iv) $(a^2 - 3a + 5)(2a - 3) - (5a^2 + 3a - 3)(a - 1)$

14. Find the products of the following.

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

(ii) $(x - 3y)(x^2 + 3xy)$

(iii) $\left(x^3 + \frac{1}{x^3}\right)\left(x + \frac{1}{2}\right)$

(iv) $(x^2 - a^2)(x - a)$

(v) $\left(\frac{2}{7}x + \frac{3}{5}y\right)(x^2 + y^2)$

(vi) $(a^2b + ab^2)(b^2c + c^2b)$

15. Find the following products by using identities

(i) $(5x + 9)(5x - 9)$

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

(iii) $(x^2y + 3z)(x^2y - 3z)$

(iv) $\left(x + \frac{1}{x}\right)\left(x - \frac{1}{x}\right)$

16. Find the following products.

(i) $(5x - 3y)(5x - 3y)$

(ii) $(y - 3)(y - 3)$

(iii) $(x^2 - 5)(x^2 - 5)$

(iv) $\left(\frac{3}{4}x - \frac{5}{6}y\right)\left(\frac{3}{4}x - \frac{5}{6}y\right)$

17. Find the following products.

(i) $(x + 3)(x + 3)$

(ii) $(2a + 3b)(2a + 3b)$

(iii) $\left(\frac{7}{9}x + y\right)\left(\frac{7}{9}x + y\right)$

(iv) $\left(\frac{2}{3}x + 5\right)\left(\frac{2}{3}x + 5\right)$

18. Simplify using identities.

(i) $133 \times 133 - 121 \times 121$

(ii) $5.89 \times 5.89 - 0.11 \times 0.11$

(iii) $\frac{93 \times 93 - 5 \times 5}{88}$

(iv) $\frac{3.29 \times 3.29 - 0.17 \times 0.17}{3.12}$

19. Find the value of the expression $36x^2 + 60xy + 2y^2$, when $x = 4$ and $y = -7$.

20. Find the value of the following expressions, when $x = 4$ and $y = 7$.

(i) $49x^2 + 126xy + 81y^2$

(ii) $4x^2 - 12xy + 9y^2$

(iii) $(x^4 - y^4)$

21. If $\left(x + \frac{1}{x}\right) = 3$, find the value of $\left(x^2 + \frac{1}{x^2}\right)$.

22. Using the identities, evaluate the following.

(i) 102^2

(ii) 311^2

(iii) 72^2

(iv) 89^2

(v) 118^2

(vi) 989^2

(vii) 13×7

(viii) 73×67

(ix) 9.3×8.7

(x) 12.5×11.5

(xi) 105×95

(xii) 153×147