مشق 2.4

تجزی کیجیے۔

1۔ $8x^3 - y^3$

حل:

$8x^3 - y^3 = (2x)^3 - y^3$

چونکہ $a^3 - b^3 = (a - b)(a^2 + ab + b^2)$

اس لیے $= (2x - y)(4x^2 + 2xy + y^2)$

2۔ $27x^3 + 1$

حل:

$27x^3 + 1 = (3x)^3 + (1)^3$

چونکہ $a^3 + b^3 = (a + b)(a^2 - ab + b^2)$

$= (3x + 1)(9x^2 - 3x + 1)$

3۔ $1 - 343x^3$

حل:

$1 - 343x^3 = (1)^3 - (7x)^3$

$= (1 - 7x)(1 + 7x + 49x^2)$ $\therefore a^3 - b^3 = (a - b)(a^2 + ab + b^2)$

4- $a^3b^3 + 512$

حل:

$a^3b^3 + 512 = (ab)^3 + (8)^3$

$\therefore a^3 + b^3 = (a + b)(a^2 - ab + b^2)$

$= (ab + 8)[(ab)^2 - (ab)(8) + (8)^2]$

$= (ab + 8)(a^2b^2 - 8ab + 64)$

5- $27 - 1000y^3$

حل:

$27 - 1000y^3 = (3)^3 - (10y)^3$

$\therefore a^3 - b^3 = (a - b)(a^2 + ab + b^2)$

$= (3 - 10y)[(3)^2 + (3)(10y) + (10y)^2]$

$= (3 - 10y)(9 + 30y + 100y^2)$

6- $27x^3 - 64y^3$

حل:

$27x^3 - 64y^3 = (3x)^3 - (4y)^3$

$\therefore a^3 - b^3 = (a - b)(a^2 + ab + b^2)$

$= (3x - 4y)[(3x)^2 + (3x)(4y) + (4y)^2]$

$= (3x - 4y)(9x^2 + 12xy + 16y^2)$ پس

7- $x^3y^3 + z^3$

حل:

$x^3y^3 + z^3 = (xy)^3 + z^3$

$\therefore a^3 + b^3 = (a + b)(a^2 - ab + b^2)$

$= (xy + z)(x^2y^2 - xyz + z^2)$ پس

8- $216p^3 - 343$

حل:

$216p^3 - 343 = (6p)^3 - (7)^3$

$\therefore a^3 - b^3 = (a - b)(a^2 + ab + b^2)$

$= (6p - 7)[(6p)^2 + (6p)(7) + (7)^2]$

$= (6p - 7)(36p^2 + 42p + 49)$ پس

9- $8x^3 - \frac{1}{27}$

حل:

$8x^3 - \frac{1}{27} = (2x)^3 - \left(\frac{1}{3}\right)^3$

$\therefore a^3 - b^3 = (a - b)(a^2 + ab + b^2)$

$= \left(2x - \frac{1}{3}\right)\left(4x^2 + \frac{2}{3}x + \frac{1}{9}\right)$

10۔ $a^3 + b^3 + a + b$

حل:

$$a^3 + b^3 + a + b = (a^3 + b^3) + (a + b)$$
$$= (a + b)(a^2 - ab + b^2) + (a + b) \quad \text{کو مشترک لینے سے } (a + b)$$
$$= (a + b)(a^2 - ab + b^2 + 1)$$

11۔ $a - b - a^3 + b^3$

حل:

$$a - b - a^3 + b^3 = (a - b) - (a^3 - b^3)$$
$$= (a - b) - (a - b)(a^2 + ab + b^2) \quad \text{کو مشترک لینے سے } (a - b)$$
$$= (a - b)[1 - (a^2 + ab + b^2)]$$

12: $x - 8xy^3$

حل:

$$x - 8xy^3 = x(1 - 8y^3)$$
$$= x[1^3 - (2y)^3]$$
$$= x[(1 - 2y)(1 + 2y + 4y^2)]$$
$$= x(1 - 2y)(1 + 2y + 4y^2)$$

13۔ $x^{12} - y^{12}$

حل:

$$x^{12} - y^{12} = (x^6)^2 - (y^6)^2$$
$$\therefore a^2 - b^2 = (a + b)(a - b)$$
$$= (x^6 + y^6)(x^6 - y^6)$$
$$= [(x^2)^3 + (y^2)^3][(x^3)^2 - (y^3)^2] \qquad \therefore a^3 \pm b^3 = (a \pm b)(a^2 \mp ab + b^2)$$
$$= (x^2 + y^2)(x^4 - x^2y^2 + y^4)[(x^3 + y^3)(x^3 - y^3)]$$
$$= (x^2 + y^2)(x^4 - x^2y^2 + y^4)(x + y)(x^2 - xy + y^2)(x - y)(x^2 + xy + y^2)$$
$$= (x + y)(x - y)(x^2 + y^2)(x^2 - xy + y^2)(x^2 + xy + y^2)(x^4 - x^2y^2 + y^4)$$

14۔ $1 - \dfrac{64p^3}{q^3}$

حل:

$$1 - \frac{64p^3}{q^3} = (1)^3 - \left(\frac{4p}{q}\right)^3$$
$$= \left(1 - \frac{4p}{q}\right)\left(1 + \frac{4p}{q} + \frac{16p^2}{q^2}\right)$$

15: $1 + 64u^3$

حل:

$$1 + 64u^3 = (1)^3 + (4u)^3$$
$$= (1 + 4u)(1 - 4u + 16u^2)$$

16۔ $8x^3 - 6x - 9y + 27y^3$

حل:

$$8x^3 - 6x - 9y + 27y^3 = 8x^3 + 27y^3 - 6x - 9y$$
$$= (2x)^3 + (3y)^3 - 3(2x + 3y)$$
$$= (2x + 3y)(4x^2 - 6xy + 9y^2) - 3(2x + 3y)$$

$(2x + 3y)$ مشترک لینے سے

پس $= (2x + 3y)(4x^2 - 6xy + 9y^2 - 3)$

17۔ $z^3 + 125$

حل:

$z^3 + 125 = z^3 + 5^3$
$= (z + 5)(z^2 - 5z + 25)$

18۔ $x^9 + y^9$

حل:

$x^9 + y^9 = (x^3)^3 + (y^3)^3$
$= (x^3 + y^3)(x^6 - x^3y^3 + y^6)$
$= (x + y)(x^2 - xy + y^2)(x^6 - x^3y^3 + y^6)$

19۔ $m^6 - n^6$

حل:

$m^6 - n^6 = (m^3)^2 - (n^3)^2$
$= (m^3 + n^3)(m^3 - n^3)$
$= (m + n)(m^2 - mn + n^2)(m - n)(m^2 + mn + n^2)$
$= (m + n)(m - n)(m^2 + mn + n^2)(m^2 - mn + n^2)$

20۔ $64x^7 - xa^6$

حل:

$64x^7 - xa^6 = x(64x^6 - a^6)$
$= x[(2x)^6 - a^6]$
$= x[(2x)^3]^2 - [(a^3)^2]$ $\quad \therefore a^2 - b^2 = (a + b)(a - b)$
$= x[(2x)^3 - a^3][(2x)^3 + a^3]$ $\quad \therefore a^3 \pm b^3 = (a \pm b)(a^2 \mp ab + b^2)$
$= x(2x - a)(4x^2 + 2ax + a^2)(2x + a)(4x^2 - 2ax + a^2)$
$= x(2x - a)(2x + a)(4x^2 + 2ax + a^2)(4x^2 - 2ax + a^2)$

21: $x^3 - 27a^3$

حل:

$x^3 - 27a^3 = x^3 - (3a)^3$
$= (x - 3a)(x^2 + 3ax + 9a^2)$

22۔ $x^3 + 27a^3$

حل:

$x^3 + 27a^3 = x^3 + (3a)^3$
$= (x + 3a)(x^2 - 3ax + 9a^2)$