Q 1 . $64a^3 + 125b^3 + 240a^2b + 300ab^2$

SOLUTION :

$= (4a)^3 + (5b)^3 + 3(4a)^2 (5b) + 3 (4a) (5b)^2$

$[\because a^3 + b^3 + 3a^2b + 3ab^2 = (a + b)^3]$

$= (4a + 5b)^3$

$= (4a + 5b) (4a + 5b) (4a + 5b)$

$\therefore 64a^3 + 125b^3 + 240a^2b + 300ab^2 = (4a + 5b) (4a + 5b) (4a + 5b)$

Q 2 . $125x^3 - 27y^3 - 225x^2y + 135xy^2$

SOLUTION :

$= (5x)^3 - (3y)^3 - 3(5x)^2 (3y) + 3 (5x) (3y)^2$ $[\because a^3 - b^3 - 3a^2b + 3ab^2 = (a - b)^3]$

$=(5x - 3y)^3$

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

$\therefore 125x^3 - 27y^3 - 225x^2y + 135xy^2 = (5x - 3y) (5x - 3y) (5x - 3y)$

Q 3 . $\frac{8}{27}x^3 + 1 + \frac{4}{3}x^2 + 2x$

SOLUTION :

$= (\frac{2}{3}x^3)^3 + 1^3 + 3 \times (\frac{2}{3}x)^2 \times 1 + 3(1)^2 \times (\frac{2}{3}x)$

$=(\frac{2}{3}x + 1)^3$ $[\because x^3 + b^3 + 3x^2b + 3xb^2 = (x + b)^3]$

$=(\frac{2}{3}x + 1) (\frac{2}{3}x + 1) (\frac{2}{3}x + 1)$

$\therefore \frac{8}{27}x^3 + 1 + \frac{4}{3}x^2 + 2x = (\frac{2}{3}x + 1) (\frac{2}{3}x + 1) (\frac{2}{3}x + 1)$

Q 4 . $8x^3 + 27y^3 + 36x^2y + 54xy^2$

SOLUTION :

$= (2x)^3 + (3y)^3 + 3 \times (2x)^2 \times 3y + 3 \times (2x) (3y)^2$

$= (2x + 3y)^3$ $[\because$

$a^3 + b^3 + 3a^2b + 3ab^2 = (a + b)^3]$

$=(2x+3y)(2x+3y)(2x+3y)$

$\therefore 8x^3+27y^3+36x^2y+54xy^2=(2x+3y)(2x+3y)(2x+3y)$

Q 5. $a^3-3a^2b+3ab^2-b^3+8$

SOLUTION :

$=(a-b)^3+2^3$ $\quad[\because a^3-b^3-3a^2b+3ab^2=(a-b)^3]$

$=(a-b+2)((a-b)^2-(a-b)2+2^2)$ $\quad\because [a^3+b^3=(a+b)(a^2-ab+b^2)]$

$=(a-b+2)(a^2+b^2-2ab-2(a-b)+4)$

$=(a-b+2)(a^2+b^2-2ab-2a+2b+4)$

$\therefore a^3-3a^2b+3ab^2-b^3+8=(a-b+2)(a^2+b^2-2ab-2a+2b+4)$

Q 6. $x^3+8y^3+6x^2y+12xy^2$

SOLUTION :

$=(x)^3+(2y)^3+3\times x^2\times 2y+3\times x\times(2y)^2$

$=(x+2y)^3$ $\quad[\because x^3+y^3+3x^2y+3xy^2=(x+y)^3]$

$=(x+2y)(x+2y)(x+2y)$

$\therefore x^3+8y^3+6x^2y+12xy^2=(x+2y)(x+2y)(x+2y)$

Q 7. $8x^3+y^3+12x^2y+6xy^2$

SOLUTION :

$=(2x)^3+(y)^3+3\times(2x)^2\times y+3(2x)\times y^2$

$=(2x+y)^3$ $\quad[\because a^3+b^3+3a^2b+3ab^2=(a+b)^3]$

$=(2x+y)(2x+y)(2x+y)$

$\therefore 8x^3+y^3+12x^2y+6xy^2=(2x+y)(2x+y)(2x+y)$

Q 8. $8a^3+27b^3+36a^2b+54ab^2$

SOLUTION :

$=(2a)^3+(3b)^3+3\times(2a)^2\times 3b+3\times 2a\times(3b)^2$

$= (2a + 3b)^3$ $[\because a^3 + b^3 + 3a^2b + 3ab^2 = (a + b)^3]$

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

$\therefore 8a^3 + 27b^3 + 36a^2b + 54ab^2 = (2a + 3b)(2a + 3b)(2a + 3b)$

Q 9 . $8a^3 - 27b^3 - 36a^2b + 54ab^2$

SOLUTION :

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

$= (2a - 3b)^3$ $[\because a^3 - b^3 - 3a^2b + 3ab^2 = (a - b)^3]$

$=(2a - 3b)(2a - 3b)(2a - 3b)$

$\therefore 8a^3 - 27b^3 - 36a^2b + 54ab^2 = (2a - 3b)(2a - 3b)(2a - 3b)$

Q 10 . $x^3 - 12x(x - 4) - 64$

SOLUTION :

$= x^3 - 12x^2 + 48x - 64$

$= x^3 - 3 \times x^2 \times 4 + 3 \times 4^2 \times x - 4^3$

$= (x - 4)^3$ $[\because a^3 - b^3 - 3a^2b + 3ab^2 = (a - b)^3]$

$=(x - 4)(x - 4)(x - 4)$

$\therefore x^3 - 12x(x - 4) - 64 = (x - 4)(x - 4)(x - 4)$

Q 11 . $a^3x^3 - 3a^2bx^2 + 3ab^2x - b^3$

SOLUTION :

$= (ax)^3 - 3(ax)^2 \times b + 3(ax) \times b^2 - b^3$

$= (ax - b)^3$ $[\because a^3 - b^3 - 3a^2b + 3ab^2 = (a - b)^3]$

$=(ax - b)(ax - b)(ax - b)$

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