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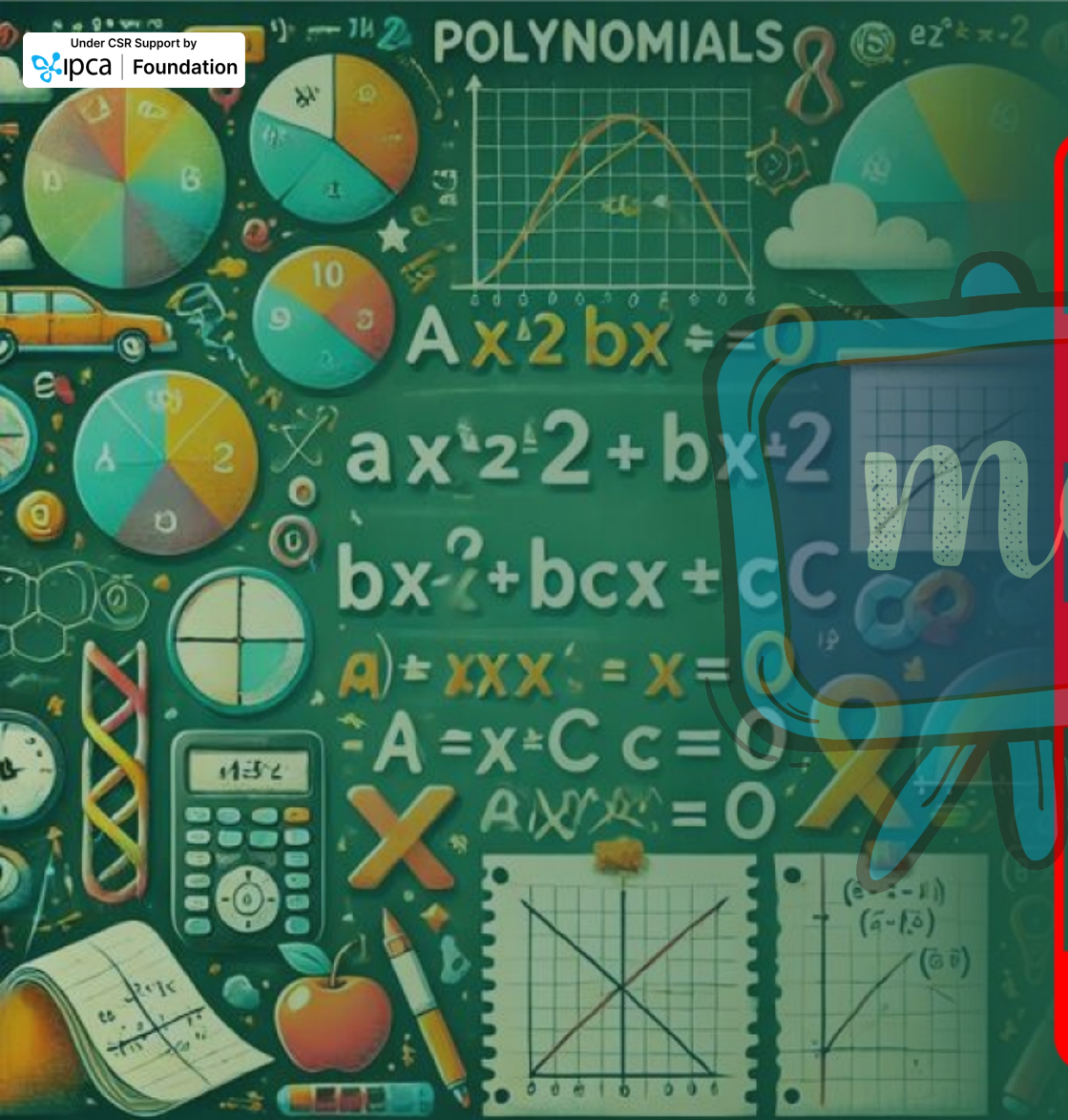

CLASS – 9

MATHS

Chapter - 2

Polynomials

Part – 17

Exercise 2.4 (Question 8 – 11)

Vikas Saini

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8. Factorise each of the following:

(i) $8a^3 + b^3 + 12a^2b + 6ab^2$

$4a^2 = (2a)^2$

$8a^3 = (2a)^3$

$= 8a^3 + b^3 + 12a^2b + 6ab^2$

$= (2a)^3 + b^3 + 3 \times 4a^2 \times b + 3 \times 2a \times b^2$

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

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

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

$x = 2a$

$y = b$

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

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$(4a^2) = (2a)^2$

$(2a)^2 = 4a^2$

(ii) $8a^3 - b^3 - 12a^2b + 6ab^2$

$= 8a^3 - b^3 - 12a^2b + 6ab^2$

$= (2a)^3 - (b)^3 - 3 \times 4a^2 \times b + 3 \times 2a \times b^2$

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

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

$x = 2a$

$y = b$

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$= (2a - b)^3$



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$125a^3 = (5a)^3$ (iii) $27 - 125a^3 - 135a + 225a^2$

$5 \times 5 \times 5 = 125$

$(5a)^3 = 125a^3$

$= (3)^3 - (5a)^3 - 3 \times 9 \times 5 \times a + 3 \times 3 \times 5 \times 5 \times a^2$

$= (3)^3 - (5a)^3 - 3 \times (3)^2 \times 5a + 3 \times 3 \times (5a)^2$

$= (3)^3 - (5a)^3 - 3 \times (3)^2 \times 5a + 3 \times 3 \times (5a)^2$

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

$x = 3$

$y = 5a$

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$= (3-5^{-}a)^{3}$



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$3 \times 4a \times 9b^2$

$108ab^2$

$(4a)^3$

$4 \times 4 \times 4 = 64$

$3 \times (4a)^2 \times 3b$

$3 \times 16 \times a^2 \times 3 \times b$

$3 \times 3 \times 16 \times ab^2$

$9 \times 16 \times a^2b$

$144a^2b$

(iv) $64a^3 - 27b^3 - 144a^2b + 108ab^2$

$= (4a)^3 - (3b)^3 - 3 \times (4a)^2 \times 3b + 3 \times 4a \times (3b)^2$

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

$x = 4a$

$y = 3b$

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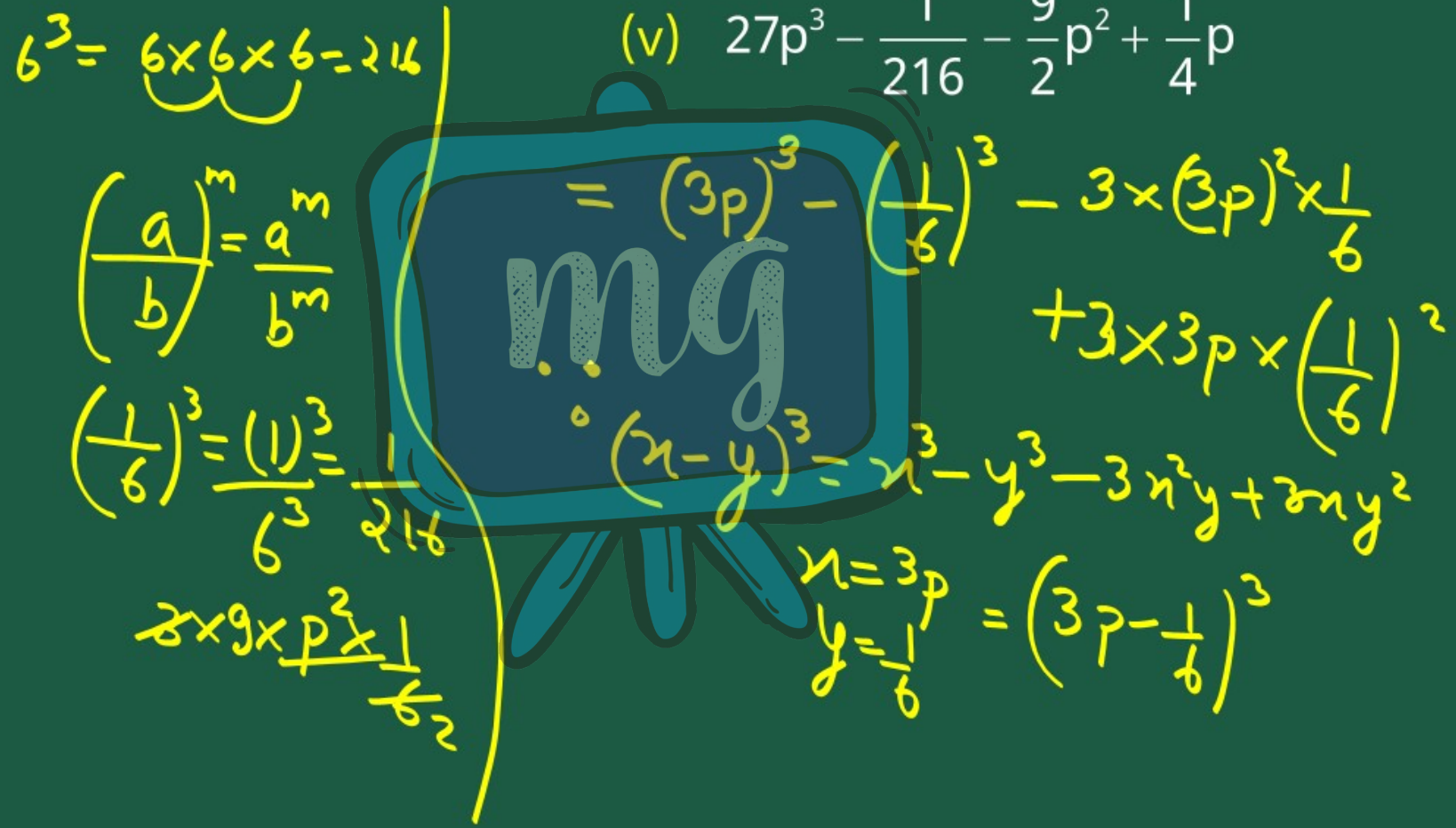

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9. Verify :

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

By taking R.H.S

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

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

$= x^3 - x^2y + xy^2 + x^2y - xy^2 + y^3$

$= x^3 + y^3$

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

By taking R.H.S

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

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

$= x^3 + x^2y + xy^2 - x^2y - xy^2 - y^3$

$= x^3 - y^3$

$-(yx+xxy)$

$-xy^2$

y^2xy

$-yxyxy$

$-y^3$

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10. Factorise each of the following:

(i) $27y^3 + 125z^3$

$= (27y^3) + (125z^3)$

$= (3y)^3 + (5z)^3$

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

$x = 3y$

$y = 5z$

$= (3y+5z)\{(3y)^2 + (5z)^2 - 3y(5z)\}$

$= (3y+5z)(9y^2 + 25z^2 - 15yz)$

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$$= (3y + 5z)(9y^2 + 25z^2 - 15yz)$$



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(ii) $64m^3 - 343n^3$

$= (4m)^3 - (7n)^3$

$\therefore x^3 - y^3 = (x - y)(x^2 + y^2 + xy)$

$x = 4m, \; y = 7n$

$(4m)^3 - (7n)^3 = (4m - 7n) \times ((4m)^2 + (7n)^2 + 4m \times 7n)$

$= (4m - 7n) \times (16m^2 + 49n^2 + 28mn)$

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11. Factorise : $27x^3 + y^3 + z^3 - 9xyz$

$= (3x)^3 + (y)^3 + (z)^3 - 3 \times 3x \times y \times z$

$a^3 + b^3 + c^3 - 3abc = (a+b+c)(a^2+b^2+c^2 - ab - bc - ca)$

So $a = 3x$, $b = y$ and $c = z$

$= (3x+y+z)((3x)^2 + y^2 + z^2 - 3xy - yz - 3xz)$

$= (3x+y+z)(9x^2 + y^2 + z^2 - 3xy - yz - 3xz)$