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ARJUN BATCH

CLASS 9th MATHS

बहुपद

Chapter-2 | Part-8



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आज क्या पढेंगे ?

1 प्रश्नावली - 2.4



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बीजीय सर्वसमिकाएँ

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

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

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

$(x+a)(x+b) = x^2+x(a+b)+ab$

$(x+y+z)^2 = x^2+y^2+z^2+2xy+2yz+2zx$

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

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

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4. उपयुक्त सर्वसमिकाओं का प्रयोग करके निम्नलिखित में से प्रत्येक का प्रसार कीजिए :

(i) $(x + 2y + 4z)^2$

$(x+y+z)^2 = x^2+y^2+z^2+2xy+2yz+2zx$

$= x^2 + (2y)^2 + (4z)^2 + 2 \times x \times 2y + 2 \times 2y \times 4z + 2 \times 4z \times x$

$= x^2 + 4y^2 + 16z^2 + 4xy + 16yz + 8xz$

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I → 2x
II → −y
III → z

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

I II III

हल :-

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

$2(2x)(-y) + 2(-y)(z) + 2 \times z \times 2x$

$= 4x^2 + y^2 + z^2 - 4xy - 2yz + 4xz$

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

हल :-

$$(-2x+3y+2z)^2 = (-2x)^2+(3y)^2+(2z)^2+2(-2x)(3y)$$
$$+2(3y)(2z)+2(-2x)(2z)$$
$$= 4x^2+9y^2+4z^2-12xy+12yz-8xz$$

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H.W.

(iv) $(3a - 7b - c)^2$



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H.W.

(v) $(-2x + 5y - 3z)^2$



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I → $\frac{a}{4}$

II → $-\frac{b}{2}$

III → 1

(vi) $\left[\frac{1}{4}a - \frac{1}{2}b + 1\right]^2$

हल :- $\left[\frac{a}{4} - \frac{b}{2} + 1\right]^2$

$= \left(\frac{a}{4}\right)^2 + \left(-\frac{b}{2}\right)^2 + (1)^2 + 2\left(\frac{a}{4}\right)\left(\frac{-b}{2}\right) + 2\left(\frac{-b}{2}\right)(1) + 2\left(\frac{a}{4}\right)(1)$

$= \frac{a^2}{16} + \frac{b^2}{4} + 1 - \frac{ab}{4} - b + \frac{a}{2}$

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$4x^2 = (2x)^2$

$9y^2 = (3y)^2$

$16z^2 = (4z)^2$

5. गुणनखंडन कीजिए:

(i) $4x^2 + 9y^2 + 16z^2 + 12xy - 24yz - 16xz$

हल:- $4x^2 + 9y^2 + 16z^2 + 12xy - 24yz - 16xz$

$(2x)^2 + (3y)^2 + (4z)^2$

$= (2x + 3y + 4z)^2$

$(x+y+z)^2 = x^2 + y^2 + z^2 + 2xy + 2yz + 2zx$

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(ii) $2x^2 + y^2 + 8z^2 - 2\sqrt{2}\,xy + 4\sqrt{2}\,yz - 8xz$

$I^2 = 2x^2$

$I = -\sqrt{2x^2}$

$I = \sqrt{2}\,x$

$II^2 = y^2 \Rightarrow II = y$

$III^2 = 8z^2$

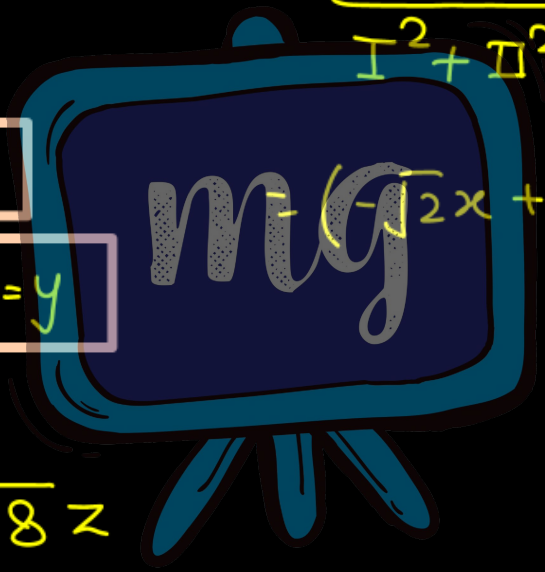
$III = \sqrt{8z^2} = \sqrt{8}\,z$

$= \sqrt{4 \times 2}\,z$

$= 2\sqrt{2}z$

$I^2 + II^2 + III^2 + 2I\,II + 2II\,III + 2III\,I$

$= (-\sqrt{2}x + y + 2\sqrt{2}z)^2$



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

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

प्रश्नावली - 2.4

6. निम्नलिखित घनों को प्रसारित रूप में लिखिए :

(i) $(2x + 1)^3$

हल :

$(\underbrace{2x}_{a} + \underbrace{1}_{b})^3 = (2x)^3 + 3x(2x)^2 x 1 + 3x 2x x (1)^2 + (1)^3$

$= 8x^3 + 3 x 4x^2 x 1 + 6x + 1$

$= 8x^3 + 12x^2 + 6x + 1$

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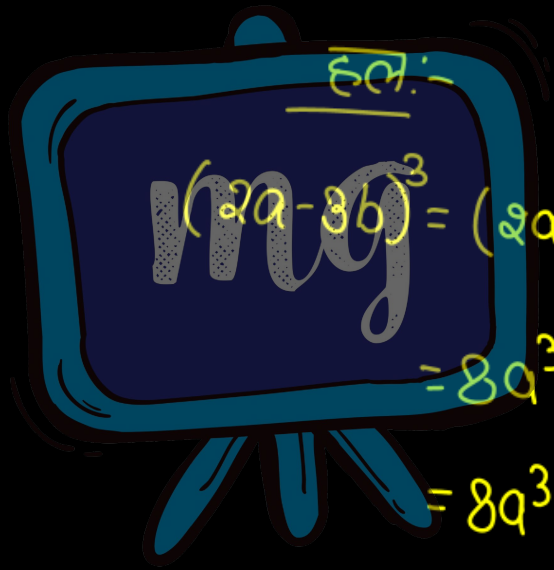
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$(I-II)^3 = I^3 - 3I^2II + 3III^2 + II^3$ (I) (II)

(ii) $(2a - 3b)^3$



हल :-

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

$= 8a^3 - 3 \times 4a^2 \times 3b + 3 \times 2a \times 9b^2 + 27b^3$

$= 8a^3 - 36a^2b + 54ab^2 + 27b^3$

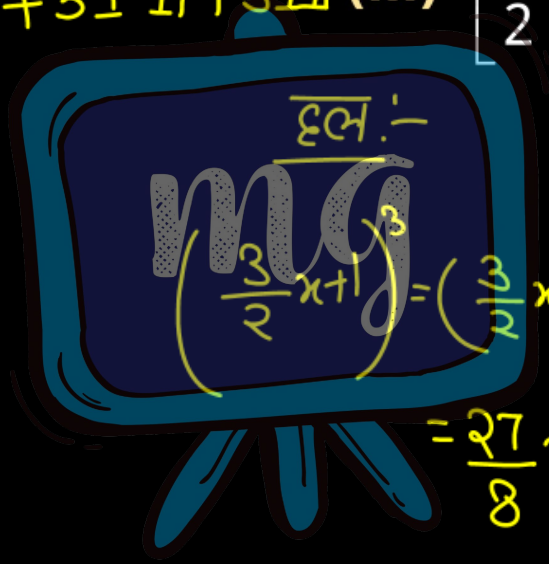
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प्रश्नावली - 2.4

$(I+II)^3 = I^3 + II^3 + 3I^2II + 3III$

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



हल :-

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

$= \frac{27}{8}x^3 + 1 + 3 \times \frac{9}{4}x^2 + \frac{9}{2}x$

$= \frac{27}{8}x^3 + \frac{27}{4}x^2 + \frac{9}{2}x + 1$

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$(I-II)^3 = I^3 - II^3 - 3I^2II + 3$

(iv) $\left[x - \frac{2}{3}y\right]^3$

हल :-

$\left[x - \frac{2}{3}y\right]^3 = x^3 - \left(\frac{2}{3}y\right)^3 - 3(x)^2\left(\frac{2}{3}y\right) + 3(x)\left(\frac{2}{3}y\right)^2$

$= x^3 - \frac{8}{27}y^3 - 2x^2y + 3 \cdot x \cdot \frac{4}{9}y^2$

$= x^3 - \frac{8}{27}y^3 - 2x^2y + \frac{4}{3}xy^2$

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1000300
−30001
970299

प्रश्नावली - 2.4

7. उपयुक्त सर्वसमिकाएँ प्रयोग करके निम्नलिखित के मान ज्ञात कीजिए:

(i) $(99)^3$

$(I-II)^3 = I^3 - II^3 - 3I^2II + 3III^2$

हल :- $(99)^3 = (100-1)^3$

$(100-1)^3 = (100)^3 - (1)^3 - 3(100)^2(1) + 3(100)(1)^2$

$= 1000000 - 1 - 3 \times 10000 + 300$

$= 970299$