

Maharashtra Board Solutions Class 8-Maths (Practice Set 6.3): Chapter 6- Factorisation of Algebraic Expressions



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Class 8: Maths Chapter 6 solutions. Complete Class 8 Maths Chapter 6 Notes.

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Maharashtra Board 8th Maths Chapter 6, Class 8 Maths Chapter 6 solutions

Question 1.

Factorize

i. $y^3 - 27$

ii. $x^3 - 64y^3$

iii. $27m^3 - 216n^3$

iv. $125y^3 - 1$

v. $8p^3 - \frac{27}{p^3}$

vi. $343a^3 - 512b^3$

vii. $64x^3 - 729y^3$

viii. $16a^3 - \frac{128}{b^3}$

Solution:

i. $y^3 - 27$

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

Here, $a = y$ and $b = 3$

$$\therefore y^3 - 27 = (y - 3)[y^2 + y(3) + (3)^2]$$

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

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

ii. $x^3 - 64y^3$

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

Here, $a = x$ and $b = 4y$

$$\therefore x^3 - 64y^3 = (x - 4y)[x^2 + x(4y) + (4y)^2]$$

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

$$= (x - 4y)(x^2 + 4xy + 16y^2)$$

iii. $27m^3 - 216n^3$

$$= 27 (m^3 - 8n^3)$$

... [Taking out the common factor 27]

$$= 27 [m^3 - (2n)^3]$$

Here, $a = m$ and $b = 2n$

$$\therefore 27m^3 - 216n^3$$

$$= 27 \{(m - 2n) [m^2 + m(2n) + (2n)^2]\}$$

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

$$= 27 (m - 2n)(m^2 + 2mn + 4n^2)$$

iv. $125y^3 - 1$

$$= (5y)^3 - 1^3$$

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Here, $a = 5y$ and $b = 1$

$$\therefore 125y^3 - 1 = (5y - 1) [(5y)^2 + (5y)(1) + (1)^2]$$

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

$$= (5y - 1) (25y^2 + 5y + 1)$$

v. $8p^3 - \frac{27}{p^3}$

$$= (2p)^3 - \left(\frac{3}{p}\right)^3$$

$$\text{Here, } a = 2p \text{ and } b = \frac{3}{p}$$

$$\therefore 8p^3 - \frac{27}{p^3} = \left(2p - \frac{3}{p}\right) \left[(2p)^2 + (2p)\left(\frac{3}{p}\right) + \left(\frac{3}{p}\right)^2\right]$$

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

$$= \left(2p - \frac{3}{p}\right) \left(4p^2 + 6 + \frac{9}{p^2}\right)$$

vi. $343a^3 - 512b^3$

$$= (7a)^3 - (8b)^3$$

Here, $A = 7a$ and $B = 8b$

$$\therefore 343a^3 - 512b^3$$

$$= (7a - 8b) [(7a)^2 + (7a)(8b) + (8b)^2]$$

$$\dots [\because A^3 - B^3 = (A - B)(A^2 + AB + B^2)]$$

$$= (7a - 8b) (49a^2 + 56ab + 64b^2)$$

vii. $64x^3 - 729y^3$

$$= (4x)^3 - (9y)^3$$

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Here, $a = 4x$ and $b = 9y$

$$\therefore 64x^3 - 729y^3$$

$$= (4x - 9y) [(4x)^2 + (4x)(9y) + (9y)^2]$$

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

$$= (4x - 9y) (16x^2 + 36xy + 81y^2)$$

$$\text{viii. } 16a^3 - \frac{128}{b^3}$$

$$= 16 \left(a^3 - \frac{8}{b^3} \right)$$

...[Taking out the common factor 16]

$$= 16 \left[a^3 - \left(\frac{2}{b} \right)^3 \right]$$

$$\text{Here, } A = a \text{ and } B = \frac{2}{b}$$

$$\therefore 16a^3 - \frac{128}{b^3} = 16 \left(a - \frac{2}{b} \right) \left[a^2 + a \left(\frac{2}{b} \right) + \left(\frac{2}{b} \right)^2 \right]$$

$$\dots [\because A^3 - B^3 = (A - B)(A^2 + AB + B^2)]$$

$$= 16 \left(a - \frac{2}{b} \right) \left(a^2 + \frac{2a}{b} + \frac{4}{b^2} \right)$$

Question 2.

Simplify:

$$\text{i. } (x + y)^3 - (x - y)^3$$

$$\text{ii. } (3a + 5b)^3 - (3a - 5b)^3$$

$$\text{iii. } (a + b)^3 - a^3 - b^3$$

$$\text{iv. } p^3 - (p + 1)^3$$

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v. $(3xy - 2ab)^3 - (3xy + 2ab)^3$

Solution:

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

Here, $a = x + y$ and $b = x - y$

$$\begin{aligned} & (x + y)^3 - (x - y)^3 \\ &= [(x + y) - (x - y)] [(x + y)^2 + (x + y)(x - y) + (x - y)^2] \\ &\dots [a^3 - b^3 = (a - b)(a^2 + ab + b^2)] \\ &= (x + y - x + y) [(x^2 + 2xy + y^2) + (x^2 - y^2) + (x^2 - 2xy + y^2)] \\ &= 2y(x^2 + x^2 + x^2 + 2xy - 2xy + y^2 - y^2 + y^2) \\ &= 2y(3x^2 + y^2) \\ &= 6x^2y + 2y^3 \end{aligned}$$

ii. $(3a + 5b)^3 - (3a - 5b)^3$

Here, $A = 3a + 5b$ and $B = 3a - 5b$

$$\begin{aligned} &= [(3a + 5b) - (3a - 5b)] [(3a + 5b)^2 + (3a + 5b)(3a - 5b) + (3a - 5b)^2] \\ &\dots [A^3 - B^3 = (A - B)(A^2 + AB + B^2)] \\ &= (3a + 5b - 3a + 5b) [(9a^2 + 30ab + 25b^2) + (9a^2 - 25b^2) + (9a^2 - 30ab + 25b^2)] \\ &= 10b(9a^2 + 9a^2 + 9a^2 + 30ab - 30ab + 25b^2 - 25b^2 + 25b^2) \\ &= 10b(27a^2 + 25b^2) \\ &= 270a^2b + 250b^3 \end{aligned}$$

iii. $(a + b)^3 - a^3 - b^3$

$$\begin{aligned} &= a^3 + 3a^2b + 3ab^2 + b^3 - a^3 - b^3 \\ &= 3a^2b + 3ab^2 \end{aligned}$$

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iv. $p^3 - (p + 1)^3$

$$= p^3 - (p^3 + 3p^2 + 3p + 1) \dots [\because (a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3]$$

$$= p^3 - p^3 - 3p^2 - 3p - 1$$

$$= -3p^2 - 3p - 1$$

v. $(3xy - 2ab)^3 - (3xy + 2ab)^3$

Here, $A = 3xy - 2ab$ and $B = 3xy + 2ab$

$$\therefore (3xy - 2ab)^3 - (3xy + 2ab)^3$$

$$= [(3xy - 2ab) - (3xy + 2ab)] [(3xy - 2ab)^2 + (3xy - 2ab)(3xy + 2ab) + (3xy + 2ab)^2]$$

$$\dots [\because A^3 - B^3 = (A - B)(A^2 + AB + B^2)]$$

$$= (3xy - 2ab - 3xy - 2ab) [(9x^2y^2 - 12xyab + 4a^2b^2) + (9x^2y^2 - 4a^2b^2) + (9x^2y^2 + 12xyab + 4a^2b^2)]$$

$$= (-4ab)(9x^2y^2 + 9x^2y^2 + 9x^2y^2 - 12xyab + 12xyab + 4a^2b^2 - 4a^2b^2 + 4a^2b^2)$$

$$= (-4ab)(27xy^2 + 4a^2b^2)$$

$$= -108x^2y^2ab - 16a^3b^3$$



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The Maharashtra State Board of Secondary & Higher Secondary Education (MSBSHSE), Pune is an independent body of the Maharashtra Government. There are more than 1.4 million students that appear in the examination every year. The Maha State Board conducts the board examination twice a year. This board conducts the examination for SSC and HSC.

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How many state boards are there in Maharashtra?

The Maharashtra State Board of Secondary & Higher Secondary Education, conducts the HSC and SSC Examinations in the state of Maharashtra through its nine Divisional Boards located at Pune, Mumbai, Aurangabad, Nasik, Kolhapur, Amravati, Latur, Nagpur and Ratnagiri.

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