

Maharashtra Board Solutions Class 8-Maths

(Practice Set 5.3): Chapter 5- Expansion

Formulae



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Maharashtra Board Solutions Class 8-Maths

(Practice Set 5.3): Chapter 5- Expansion

Formulae

Class 8: Maths Chapter 5 solutions. Complete Class 8 Maths Chapter 5 Notes.

Maharashtra Board Solutions Class 8-Maths (Practice Set 5.3): Chapter 5- Expansion Formulae

Maharashtra Board 8th Maths Chapter 5, Class 8 Maths Chapter 5 solutions

Question 1.

Expand:

i. $(2m - 5)^3$

ii. $(4 - p)^3$

iii. $(7x - 9y)^3$

iv. $(58)^3$

v. $(198)^3$

vi. $(2p-12p)^3$

vii. $(1-1a)^3$

viii. $(x^3-3x)^3$

Solution:

i. Here, $a = 2m$ and $b = 5$

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$$(2m - 5)^3$$

$$= (2m)^3 - 3(2m)^2(5) + 3(2m)(5)^2 - (5)^3$$

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

$$= 8m^3 - 3(4m^2)(5) + 3(2m)(25) - 125$$

$$= 8m^3 - 60m^2 + 150m - 125$$

ii. Here, $a = 4$ and $b = p$

$$(4 - p)^3 = (4)^3 - 3(4)^2(p) + 3(4)(p)^2 - (p)^3$$

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

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

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

iii. Here, $a = 7x$ and $b = 9y$

$$(7x - 9y)^3$$

$$= (7x)^3 - 3(7x)^2(9y) + 3(7x)(9y)^2 - (9y)^3$$

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

$$= 343x^3 - 3(49x^2)(9y) + 3(7x)(81y^2) - 729y^3$$

$$= 343x^3 - 1323x^2y + 1701xy^2 - 729y^3$$

$$\text{iv. } (58)^3 = (60 - 2)^3$$

Here, $a = 60$ and $b = 2$

$$(58)^3 = (60)^3 - 3(60)^2(2) + 3(60)(2)^2 - (2)^3$$

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

$$= 216000 - 3(3600)(2) + 3(60)(4) - 8$$

$$= 216000 - 21600 + 720 - 8$$

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$$= 195112$$

$$\text{v. } (198)^3 = (200 - 2)^3$$

Here, $a = 200$ and $b = 2$

$$(198)^3 = (200)^3 - 3(200)^2(2) + 3(200)(2)^2 - (2)^3$$

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

$$= 8000000 - 3(40000)(2) + 3(200)(4) - 8$$

$$= 8000000 - 240000 + 2400 - 8$$

$$= 7762392$$

vi. Here, $a = 2p$ and $b = \frac{1}{2p}$

$$\left(2p - \frac{1}{2p}\right)^3$$

$$= (2p)^3 - 3(2p)^2 \left(\frac{1}{2p}\right) + 3(2p) \left(\frac{1}{2p}\right)^2 - \left(\frac{1}{2p}\right)^3$$
$$\dots [(a - b)^3 = a^3 - 3a^2b + 3ab^2 - b^3]$$

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

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

$$= 8p^3 - 6p + \frac{3}{2p} - \frac{1}{8p^3}$$

vii. Here, $A = 1$ and $B = 1a$

$$\begin{aligned}\left(1 - \frac{1}{a}\right)^3 &= (1)^3 - 3(1)^2 \left(\frac{1}{a}\right) + 3(1) \left(\frac{1}{a}\right)^2 - \left(\frac{1}{a}\right)^3 \\ &\dots [(a - b)^3 = a^3 - 3a^2b + 3ab^2 - b^3] \\ &= 1 - \frac{3}{a} + \frac{3}{a^2} - \frac{1}{a^3}\end{aligned}$$

viii. Here, $a = x^3$ and $b = 3x$

$$\begin{aligned}\left(\frac{x^3}{3} - \frac{3}{x}\right)^3 &= \left(\frac{x^3}{3}\right)^3 - 3\left(\frac{x^3}{3}\right)^2 \left(\frac{3}{x}\right) \\ &\quad + 3\left(\frac{x^3}{3}\right) \left(\frac{3}{x}\right)^2 - \left(\frac{3}{x}\right)^3 \\ &\dots [(a - b)^3 = a^3 - 3a^2b + 3ab^2 - b^3] \\ &= \frac{x^9}{27} - 3\left(\frac{x^3}{3}\right)\left(\frac{x^3}{3}\right)\left(\frac{3}{x}\right) + 3\left(\frac{x^3}{3}\right)\left(\frac{3}{x}\right)\left(\frac{3}{x}\right) - \frac{27}{x^3} \\ &= \frac{x^9}{27} - 3\left(\frac{x^3}{3}\right) + 3\left(\frac{3}{x}\right) - \frac{27}{x^3} \\ &= \frac{x^9}{27} - x + \frac{9}{x} - \frac{27}{x^3}\end{aligned}$$

Question 2.

Simplify:

- $(2a + b)^3 - (2a - b)^3$
- $(3r - 2k)^3 + (3r + 2k)^3$
- $(4a - 3)^3 - (4a + 3)^3$
- $(5x - 7y)^3 + (5x + 7y)^3$

Solution:

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

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

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

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

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

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

$$= 24a^2b + 2b^3$$

$$\text{ii. } (3r - 2k)^3 + (3r + 2k)^3$$

$$= [(3r)^3 - 3(3r)^2(2k) + 3(3r)(2k)^2 - (2k)^3] + [(3r)^3 + 3(3r)^2(2k) + 3(3r)(2k)^2 + (2k)^3]$$

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

$$= (27r^3 - 54r^2k + 36rk^2 - 8k^3) + (27r^3 + 54r^2k + 36rk^2 + 8k^3)$$

$$= 27r^3 - 54r^2k + 36rk^2 - 8k^3 + 27r^3 + 54r^2k + 36rk^2 + 8k^3$$

$$= 27r^3 + 27r^3 - 54r^2k + 54r^2k + 36rk^2 + 36rk^2 - 8k^3 + 8k^3$$

$$= 54r^3 + 72rk^2$$

$$\text{iii. } (4a - 3)^3 - (4a + 3)^3$$

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

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

$$= (64a^3 - 144a^2 + 108a - 27) - (64a^3 + 144a^2 + 108a + 27)$$

$$= 64a^3 - 144a^2 + 108a - 27 - 64a^3 - 144a^2 - 108a - 27$$

$$= 64a^3 - 64a^3 - 144a^2 - 144a^2 + 108a - 108a - 27 - 27$$

$$= -288a^2 - 54$$

$$\text{iv. } (5x - 7y)^3 + (5x + 7y)^3$$

$$= [(5x)^3 - 3(5x)^2(7y) + 3(5x)(7y)^2 - (7y)^3] + [(5x)^3 + 3(5x)^2(7y) + 3(5x)(7y)^2 + (7y)^3]$$

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$$\begin{aligned}
 & \dots [(a - b)^3 = a^3 - 3a^2b + 3ab^2 - b^3, (a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3] \\
 & = (125x^3 - 525x^2y + 735xy^2 - 343y^3) + (125x^3 + 525x^2y + 735xy^2 + 343y^3) \\
 & = 125x^3 - 525x^2y + 735xy^2 - 343y^3 + 125x^3 + 525x^2y + 735xy^2 + 343y^3 \\
 & = 125x^3 + 125x^3 - 525x^2y + 525x^2y + 735xy^2 + 735xy^2 - 343y^3 + 343y^3 \\
 & = 250x^3 + 1470xy^2
 \end{aligned}$$

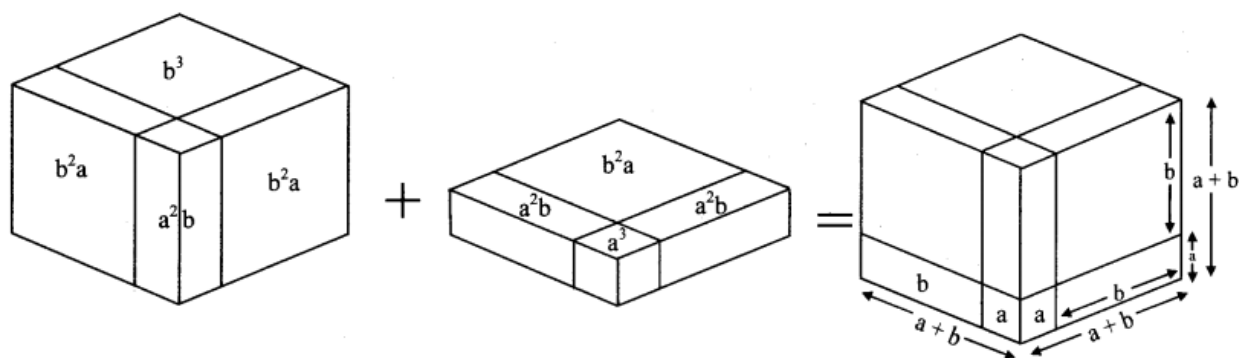
Intext Questions and Activities

Question 1.

Make two cubes of side a and of side b each. Make six parallelopipeds; three of them measuring $a \times a \times b$ and the remaining three measuring $b \times b \times a$. Arrange all these solid figures properly and make a cube of side $(a + b)$. (Textbook pg. no. 25)

Solution:

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





Maharashtra Board Solutions

Class 8 Maths

- Chapter 1- Rational and Irrational Numbers (Practice Set 1.1)
- Chapter 1- Rational and Irrational Numbers (Practice Set 1.2)
- Chapter 1- Rational and Irrational Numbers (Practice Set 1.3)
- Chapter 1- Rational and Irrational Numbers (Practice Set 1.4)
- Chapter 2- Parallel Lines and Transversals (Practice Set 2.1)
- Chapter 2- Parallel Lines and Transversals (Practice Set 2.2)
- Chapter 2- Parallel Lines and Transversals (Practice Set 2.3)
- Chapter 3- Indices and Cube Root (Practice Set 3.1)
- Chapter 3- Indices and Cube Root (Practice Set 3.2)
- Chapter 3- Indices and Cube Root (Practice Set 3.3)
- Chapter 4- Altitudes and Medians of a Triangle (Practice Set 4.1)
- Chapter 5- Expansion Formulae (Practice Set 5.1)
- Chapter 5- Expansion Formulae (Practice Set 5.2)
- Chapter 5- Expansion Formulae (Practice Set 5.3)
- Chapter 5- Expansion Formulae (Practice Set 5.4)
- Chapter 6- Factorisation of Algebraic Expressions (Practice Set 6.1)
- Chapter 6- Factorisation of Algebraic Expressions (Practice Set 6.2)
- Chapter 6- Factorisation of Algebraic Expressions (Practice Set 6.3)
- Chapter 6- Factorisation of Algebraic Expressions (Practice Set 6.4)
- Chapter 7- Variation (Practice Set 7.1)

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- Chapter 7- Variation (Practice Set 7.2)
- Chapter 7- Variation (Practice Set 7.3)
- Chapter 8- Quadrilateral: Constructions and Types (Practice Set 8.1)
- Chapter 8- Quadrilateral: Constructions and Types (Practice Set 8.2)
- Chapter 8- Quadrilateral: Constructions and Types (Practice Set 8.3)
- Chapter 9- Discount and Commission (Practice Set 9.1)
- Chapter 9- Discount and Commission (Practice Set 9.2)
- Chapter 10- Division of Polynomials (Practice Set 10.1)
- Chapter 10- Discount and Commission (Practice Set 10.2)
- Chapter 11- Statistics (Practice Set 11.1)
- Chapter 11- Statistics (Practice Set 11.2)
- Chapter 11- Statistics (Practice Set 11.3)
- Chapter 12- Equations in One Variable (Practice Set 12.1)
- Chapter 12- Equations in One Variable (Practice Set 12.2)
- Chapter 13- Congruence of Triangles (Practice Set 13.1)
- Chapter 13- Congruence of Triangles (Practice Set 13.2)
- Chapter 14- Compound Interest (Practice Set 14.1)
- Chapter 14- Compound Interest (Practice Set 14.2)
- Chapter 15- Area (Practice Set 15.1)
- Chapter 15- Area (Practice Set 15.2)
- Chapter 15- Area (Practice Set 15.3)
- Chapter 15- Area (Practice Set 15.4)
- Chapter 15- Area (Practice Set 15.5)
- Chapter 15- Area (Practice Set 15.6)
- Chapter 16- Surface Area and Volume (Practice Set 16.1)

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- Chapter 16- Surface Area and Volume (Practice Set 16.2)
- Chapter 16- Surface Area and Volume (Practice Set 16.3)
- Chapter 17- Factorisation of Algebraic Expressions (Practice Set 17.1)
- Chapter 17- Factorisation of Algebraic Expressions (Practice Set 17.2)

About About Maharashtra State Board (MSBSHSE)

The Maharashtra State Board of Secondary and Higher Secondary Education or MSBSHSE (Marathi: महाराष्ट्र राज्य माध्यमिक आणि उच्च माध्यमिक शिक्षण मंडळ), is an **autonomous and statutory body established in 1965**. The board was amended in the year 1977 under the provisions of the Maharashtra Act No. 41 of 1965.

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.

The Maharashtra government established the Maharashtra State Bureau of Textbook Production and Curriculum Research, also commonly referred to as Ebalbharati, in 1967 to take up the responsibility of providing quality textbooks to students from all classes studying under the Maharashtra State Board. MSBHSE prepares and updates the curriculum to provide holistic development for students. It is designed to tackle the difficulty in understanding the concepts with simple language with simple illustrations. Every year around 10 lakh students are enrolled in schools that are affiliated with the Maharashtra State Board.

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FAQs

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As of now, the MSCERT and Balbharti are responsible for the syllabus and textbooks of Classes 1 to 8, while Classes 9 and 10 are under the Maharashtra State Board of Secondary and Higher Secondary Education (MSBSHSE).

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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