

## Class 9-Mathematics

Instructions for students: The notes provided must be copied to the Maths copy and then do the homework in the same copy.

### Chapter 4

#### FACTORISATION-Continued

Factorisation by using the identities:

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

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

Example:

$$\begin{aligned} 8x^3 + y^3 &= (2x)^3 + y^3 && a = 2x; b = y \\ &= (2x + y)((2x)^2 - 2x \cdot y + y^2) \\ &= (2x + y)(4x^2 - 2xy + y^2) \text{ Ans.} \end{aligned}$$

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Exercise 4.5 (Factorise the following)

2. ii.  $7a^3 + 56b^3$

$$\begin{aligned} 7a^3 + 56b^3 &= 7(a^3 + 8b^3) \\ &= 7(a^3 + (2b)^3) \\ &= 7(a + 2b)(a^2 - a \cdot 2b + (2b)^2) \quad [a^3 + b^3 = (a + b)(a^2 - ab + b^2)] \\ &= 7(a + 2b)(a^2 - 2ab + 4b^2) \quad \text{Ans.} \end{aligned}$$

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6. ii.  $a^3 - b^3 - a + b$

$$\begin{aligned} a^3 - b^3 - a + b &= a^3 - b^3 - (a - b) \\ &= (a - b)(a^2 + ab + b^2) - (a - b) \quad [a^3 - b^3 = (a - b)(a^2 + ab + b^2)] \\ &= (a - b)(a^2 + ab + b^2) - 1(a - b) \quad [\text{Grouping}] \\ &= (a - b)(a^2 + ab + b^2 - 1) \text{ Ans.} \end{aligned}$$

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9. ii.  $a^3 - \frac{1}{a^3} - 2a + \frac{2}{a}$

$$a^3 - \frac{1}{a^3} - 2a + \frac{2}{a} = a^3 - \frac{1}{a^3} - 2a + \frac{2}{a}$$

$$\begin{aligned}
&= a^3 - \frac{1}{a^3} - 2\left(a - \frac{1}{a}\right) \\
&= \left(a - \frac{1}{a}\right) \left(a^2 + \frac{1}{a} + \frac{1}{a^2}\right) - 2\left(a - \frac{1}{a}\right) \\
&= \left(a - \frac{1}{a}\right) \left(a^2 + 1 + \frac{1}{a^2}\right) - 2\left(a - \frac{1}{a}\right) \\
&= \left(a - \frac{1}{a}\right) \left(a^2 + 1 + \frac{1}{a^2} - 2\right) \\
&= \left(a - \frac{1}{a}\right) \left(a^2 + \frac{1}{a^2} - 1\right) \quad \text{Ans.}
\end{aligned}$$


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10. i.  $a^6 - b^6$

$$\begin{aligned}
a^6 - b^6 &= (a^3)^2 - (b^3)^2 \\
&= (a^3 + b^3)(a^3 - b^3) \quad [a^2 - b^2 = (a + b)(a - b)] \\
&= (a + b)(a^2 - ab + b^2)(a - b)(a^2 + ab + b^2) \\
&= (a + b)(a - b)(a^2 + ab + b^2)(a^2 - ab + b^2) \text{ Ans.}
\end{aligned}$$


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11. ii.  $x^2 - \frac{8}{x}$

$$\begin{aligned}
x^2 - \frac{8}{x} &= \frac{x^3 - 8}{x} \\
&= \frac{1}{x}(x^3 - 8) \\
&= \frac{1}{x}(x^3 - 2^3) \\
&= \frac{1}{x}(x - 2)(x^2 + 2x + 4) \text{ Ans.}
\end{aligned}$$


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Home Work: Complete Exercise 4.5 (Page no. 103)