



Algebraic Identities Ex 4.3 Q18

Answer :

From given problem we have to find the value of $64x^3 - 125z^3$

Given $(4x - 5z) = 16, xz = 12$

On cubing both sides of $(4x - 5z) = 16$ we get

$$(4x - 5z)^3 = (16)^3$$

We shall use identity $(a - b)^3 = a^3 - b^3 - 3ab(a - b)$

$$4x^3 - 125z^3 - 3(4x)(5z)(4x - 5z) = 16 \times 16 \times 16$$

$$64x^3 - 125z^3 - 60(xz)(16) = 4096$$

$$64x^3 - 125z^3 - 60(12)(16) = 4096$$

$$64x^3 - 125z^3 - 11520 = 4096$$

$$64x^3 - 125z^3 = 4096 + 11520$$

$$64x^3 - 125z^3 = 15616$$

Hence the value of $64x^3 - 125z^3$ is 15616.

Algebraic Identities Ex 4.3 Q19

Answer :

In the given problem, we have to find the value of $x^3 - \frac{1}{x^3}$

$$\text{Given } x - \frac{1}{x} = 3 + 2\sqrt{2}$$

Cubing on both sides of $x - \frac{1}{x} = 3 + 2\sqrt{2}$ we get

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

We shall use identity $(a + b)^3 = a^3 + b^3 + 3ab(a + b)$

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

$$3^3 + (2\sqrt{2})^3 + 3 \times 3 \times 2\sqrt{2}(3 + 2\sqrt{2}) = x^3 - \frac{1}{x^3} - 3 \times \cancel{x} \times \frac{1}{\cancel{x}} \times (3 + 2\sqrt{2})$$

$$27 + 16\sqrt{2} + 18\sqrt{2}(3 + 2\sqrt{2}) = x^3 - \frac{1}{x^3} - 3(3 + 2\sqrt{2})$$

$$27 + 16\sqrt{2} + 18\sqrt{2} \times 3 + 18\sqrt{2} \times 2\sqrt{2} = x^3 - \frac{1}{x^3} - 9 - 6\sqrt{2}$$

$$27 + 16\sqrt{2} + 54\sqrt{2} + 72 = x^3 - \frac{1}{x^3} - 9 - 6\sqrt{2}$$

$$27 + 16\sqrt{2} + 54\sqrt{2} + 72 + 9 + 6\sqrt{2} = x^3 - \frac{1}{x^3}$$

$$[27 + 72 + 9] + [16\sqrt{2} + 54\sqrt{2} + 6\sqrt{2}] = x^3 - \frac{1}{x^3}$$

$$108 + 76\sqrt{2} = x^3 - \frac{1}{x^3}$$

Hence the value of $x^3 - \frac{1}{x^3}$ is $\boxed{108 + 76\sqrt{2}}$.

***** END *****