

Type-2: If the value of $x + \frac{1}{x} = k$, then find the value of $x^3 + \frac{1}{x^3}$

Solution: If $x + \frac{1}{x} = k$, then $\boxed{x^3 + \frac{1}{x^3} = k^3 - 3k}$

Example: If $x + \frac{1}{x} = 2$, then find $x^3 + \frac{1}{x^3} = ?$

Solution: Since $x + \frac{1}{x} = 2$, so $x^3 + \frac{1}{x^3} = (2)^3 - 3 \times 2$

$$\Rightarrow \boxed{x^3 + \frac{1}{x^3} = 8 - 6 = 2}$$

Example: If $x + \frac{1}{x} = 4$, then find $x^3 + \frac{1}{x^3} = ?$

Solution: $x + \frac{1}{x} = 4$, then $x^3 + \frac{1}{x^3} = (4)^3 - 3 \times 4$

$$\Rightarrow \boxed{x^3 + \frac{1}{x^3} = 64 - 12 = 52}$$