

2) Find the value of

$$18^3 + 7^3 + 3 \times 18 \times 7 \times 25$$

$$3^6 + 6 \times 243 \times 2 + 15 \times 81 \times 4 + 20 \times 27 \times 8 + 15 \times 9 \times 16 + 6 \times 3 \times 32 + 64$$

solution:

The form of the numerator is

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

$$\therefore N = (18+7)^3 = 25^3$$

$$\therefore D = 3^6 + {}^6C_1 3^5 \cdot 2 + {}^6C_2 3^4 \times 2^2 + {}^6C_3 3^3 \times 2^3$$

$$+ {}^6C_4 3^2 \times 2^4 + {}^6C_5 3 \times 2^5 + {}^6C_6 2^6$$

This is clearly the expansion of $(3+2)^6 = 5^6 = (25)^3$

$$\therefore \frac{N}{D} = \frac{(25)^3}{(25)^3} = 1$$