Algebraic Identities Ex 4.3 Q14

Answer :

In the given problem, we have to find the value of numbers

(i) Given $111^3 - 89^3$

We can write $111^3 - 89^3$ as $(100+11)^3 - (100-11)^3$

We shall use the identity $(a+b)^3 - (a-b)^3 = 2\left[b^3 + 3a^2b\right]$

Here $a = 100, b = 11$

1113-893=100+113-100-113

$= 2\left[11^3 + 3(100)^2(11)\right]$

$= 2[1331 + 330000]$

$= 2[331331]$

$= 662662$

Hence the value of $111^3 - 89^3$ is $\boxed{662662}$

(ii) Given $46^3 + 34^3$

We can write $46^3 + 34^3$ as $(40+6)^3 + (40-6)^3$

We shall use the identity $(a+b)^3 + (a-b)^3 = 2\left[a^3 + 3ab^2\right]$

Here $a = 40, b = 6$

$46^3 + 34^3 = (40+6)^3 + (40-6)^3$

$= 2\left[40^3 + 3(6)^2(40)\right]$

$= 2[64000 + 4320]$

$= 2[68320]$

$= 136640$

Hence the value of $46^3 + 34^3$ is $\boxed{136640}$

(iii) Given $104^3 + 96^3$

We can write $104^3 + 96^3$ as $(100+4)^3 + (100-4)^3$

We shall use the identity $(a+b)^3 + (a-b)^3 = 2\left[a^3 + 3ab^2\right]$

Here $a = 100, b = 4$

$$104^3 + 96^3 = (100+4)^3 + (100-4)^3$$
$$= 2\left[100^3 + 3(100)(4)^2\right]$$
$$= 2[1000000 + 300 \times 16]$$
$$= 2[1000000 + 4800]$$
$$= 2[1004800]$$
$$= 2009600$$

Hence the value of $104^3 + 96^3$ is $\boxed{2009600}$

(iv) Given $93^3 - 107^3$

We can write $93^3 - 107^3$ as $(100-7)^3 - (100+7)^3$

We shall use the identity $(a-b)^3 - (a+b)^3 = -2\left[b^3 + 3a^2b\right]$

Here $a = 100, b = 7$

$$93^3 - 107^3 = (100-7)^3 - (100+7)^3$$
$$= -2\left[7^3 + 3(7)(100)^2\right]$$
$$= -2[343 + 21 \times 10000]$$
$$= -2[343 + 210000]$$
$$= -2[210343]$$
$$= -420686$$

Hence the value of $93^3 - 107^3$ is $\boxed{-420686}$.

*********** END **********