Adding Sequences In The Form: $1^3 - 2^3 + 3^3 - \ldots + n^3$

A. In adding sequences of this nature there are two possibilities:

    1. n is odd

    2. n is even

B. If n is odd then use the formula:

$$a^2(4a-3), \text{ where } a = {}^{(n+1)}/_2$$

C. If n is even then use the formula:

$$-a^2(4a+3), \text{ where } a = {}^n/_2$$

D. Examples

    Ex [1] $1^3 - 2^3 + 3^3 - 4^3 + 5^3 =$ _____

        a. In this case a = 3, since ${}^{5+1}/_2 = 3$.

        b. So since 5 is odd, we use $3^2(4(3)-3) = 9(9) = 81$.

        c. The answer is 81.

    Ex [2] $(6^3 + 4^3 + 2^3) - (5^3 + 3^3 + 1^3) =$ _____

        a. In this case, the problem is switched where the odds are negative which only negates the negative from our equation.

        b. a = 3, since ${}^6/_2 = 3$.

        c. So, $3^2(4(3)+3) = 9(15) = 135$.

        d. The answer is 135.