Cubes and Cubes Roots Ex 4.1 Q5

Answer :

Five natural numbers of the form (3*n* + 1) could be written by choosing $n = 1, 2, 3 \ldots$ etc.
Let five such numbers be $4, 7, 10, 13,$ and $16.$
The cubes of these five numbers are:
$4^3 = 64,\ 7^3 = 343,\ 10^3 = 1000,\ 13^3 = 2197 \text{ and } 16^3 = 4096$
The cubes of the numbers $4, 7, 10, 13,$ and 16 could expressed as:

$64 = 3 \times 21 + 1$, which is of the form (3*n* + 1) for *n* = 21
$343 = 3 \times 114 + 1$, which is of the form (3*n* + 1) for *n* = 114
$1000 = 3 \times 333 + 1$, which is of the form (3*n* + 1) for *n* = 333
$2197 = 3 \times 732 + 1$, which is of the form (3*n* + 1) for *n* = 732
$4096 = 3 \times 1365 + 1$, which is of the form (3*n* + 1) for *n* = 1365

The cubes of the numbers $4, 7, 10, 13,$ and 16 could be expressed as the natural numbers of the form (3*n* + 1) for some natural number *n*; therefore, the statement is verified.

Cubes and Cubes Roots Ex 4.1 Q6

Answer :

Five natural numbers of the form (3*n* + 2) could be written by choosing $n = 1, 2, 3 \ldots$ etc.
Let five such numbers be $5, 8, 11, 14,$ and $17.$
The cubes of these five numbers are:
$5^3 = 125,\ 8^3 = 512,\ 11^3 = 1331,\ 14^3 = 2744, \text{ and } 17^3 = 4913.$
The cubes of the numbers $5, 8, 11, 14$ and 17 could expressed as:

$125 = 3 \times 41 + 2$, which is of the form (3*n* + 2) for *n* = 41
$512 = 3 \times 170 + 2$, which is of the form (3*n* + 2) for *n* = 170
$1331 = 3 \times 443 + 2$, which is of the form (3*n* + 2) for *n* = 443
$2744 = 3 \times 914 + 2$, which is of the form (3*n* + 2) for *n* = 914
$4913 = 3 \times 1637 + 2$, which is of the form (3*n* + 2) for *n* = 1637

The cubes of the numbers $5, 8, 11, 14,$ and 17 can be expressed as the natural numbers of the form (3*n* + 2) for some natural number *n*. Hence, the statement is verified.

Cubes and Cubes Roots Ex 4.1 Q7

Answer :

Five multiples of 7 can be written by choosing different values of a natural number *n* in the expression 7*n*.

Let the five multiples be $7, 14, 21, 28$ and $35.$

The cubes of these numbers are:

$$7^3 = 343,\ 14^3 = 2744,\ 21^3 = 9261,\ 28^3 = 21952, \text{ and } 35^3 = 42875$$

Now, write the above cubes as a multiple of 7^3. Proceed as follows:

$$343 = 7^3 \times 1$$
$$2744 = 14^3 = 14 \times 14 \times 14 = (7 \times 2) \times (7 \times 2) \times (7 \times 2) = (7 \times 7 \times 7) \times (2 \times 2 \times 2) = \times 2^3$$
$$9261 = 21^3 = 21 \times 21 \times 21 = (7 \times 3) \times (7 \times 3) \times (7 \times 3) = (7 \times 7 \times 7) \times (3 \times 3 \times 3) = \times 3^3$$
$$21952 = 28^3 = 28 \times 28 \times 28 = (7 \times 4) \times (7 \times 4) \times (7 \times 4) = (7 \times 7 \times 7) \times (4 \times 4 \times 4) \times 4^3$$
$$42875 = 35^3 = 35 \times 35 \times 35 = (7 \times 5) \times (7 \times 5) \times (7 \times 5) = (7 \times 7 \times 7) \times (5 \times 5 \times 5) \times 5^3$$

Hence, the cube of multiple of 7 is a multiple of 7^3.

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