

Cubes and Cubes Roots Ex 4.1 Q5

Answer

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Five natural numbers of the form (3n + 1) could be written by choosing n=1,2,3\dots etc. Let five such numbers be 4,7,10,13, \text{ and } 16.
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The cubes of these five numbers are:

 $4^3 = 64$, $7^3 = 343$, $10^3 = 1000$, $13^3 = 2197$ and $16^3 = 4096$

The cubes of the numbers 4, 7, 10, 13, and 16 could expressed as:

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64 = 3 \times 21 + 1, which is of the form (3n + 1) for n = 21 343 = 3 \times 114 + 1, which is of the form (3n + 1) for n = 114 1000 = 3 \times 333 + 1, which is of the form (3n + 1) for n = 333 2197 = 3 \times 732 + 1, which is of the form (3n + 1) for n = 732 4096 = 3 \times 1365 + 1, which is of the form (3n + 1) for n = 1365
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The cubes of the numbers 4, 7, 10, 13, and 16 could be expressed as the natural numbers of the form (3n+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 (3n + 2) could be written by choosing $\emph{n}=1,2,3\ldots\,\,\mathrm{etc.}$

Let five such numbers be 5, 8, 11, 14, and 17.

The cubes of these five numbers are:

 $5^3 = 125$, $8^3 = 512$, $11^3 = 1331$, $14^3 = 2744$, and $17^3 = 4913$.

The cubes of the numbers 5, 8, 11, 14 and 17 could expressed as:

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\begin{array}{l} 125=3\times 41+2, \text{ which is of the form } (3n+2) \text{ for } n=41 \\ 512=3\times 170+2, \text{ which is of the form } (3n+2) \text{ for } n=170 \\ 1331=3\times 443+2, \text{ which is of the form } (3n+2) \text{ for } n=443 \\ 2744=3\times 914+2, \text{ which is of the form } (3n+2) \text{ for } n=914 \\ 4913=3\times 1637+2, \text{ which is of the form } (3n+2) \text{ for } n=1637 \end{array}
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The cubes of the numbers 5, 8, 11, 14, and 17 can be expressed as the natural numbers of the form (3n + 2) for some natural number n. Hence, the statement is verified.

Cubes and Cubes Roots Ex 4.1 Q7

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

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

The cubes of these numbers are:

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

Now, write the above cubes as a multiple of 73. Proceed as follows:

$$\begin{array}{l} 343 = 7^3 \times 1 \\ 2744 = 14^3 = 14 \times 14 \times 14 = (7 \times 2) \times (7 \times 2) \times (7 \times 2) = (7 \times 7 \times 7) \times (2 \times 2 \times 2) = \\ \times 2^3 \\ 9261 = 21^3 = 21 \times 21 \times 21 = (7 \times 3) \times (7 \times 3) \times (7 \times 3) = (7 \times 7 \times 7) \times (3 \times 3 \times 3) = \\ \times 3^3 \\ 21952 = 28^3 = 28 \times 28 \times 28 = (7 \times 4) \times (7 \times 4) \times (7 \times 4) = (7 \times 7 \times 7) \times (4 \times 4 \times 4) \times 4^3 \\ \times 4^3 \\ 42875 = 35^3 = 35 \times 35 \times 35 \times 35 = (7 \times 5) \times (7 \times 5) \times (7 \times 5) = (7 \times 7 \times 7) \times (5 \times 5 \times 5) \times 5^3 \end{array}$$

Hence, the cube of multiple of 7 is a multiple of 73.