

Mathematics

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(Chapter – 1) (Real Numbers)(Exemplar Problems)
(Class – X)

Exercise 1.4

Question 4:

For any positive integer n , prove that $n^3 - n$ is divisible by 6.

Answer 4:

$$\text{Let } a = n^3 - n$$

$$\Rightarrow a = n \cdot (n^2 - 1)$$

$$\Rightarrow a = n \cdot (n - 1) \cdot (n + 1) \quad [\because (a^2 - b^2) = (a - b)(a + b)]$$

$$\Rightarrow a = (n - 1) \cdot n \cdot (n + 1)$$

This is the product of three consecutive positive integers. We know that the product of three consecutive positive integers is divisible by 2 as well as 3. So it must be divisible by 6.

Hence, the number $n^3 - n$ is always divisible by 6, where n is any positive integer.

