

Mathematics

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

(Class – X)

Exercise 1.4

Question 3:

Prove that one of any three consecutive positive integers must be divisible by 3.

Answer 3:

Any three consecutive positive integers must be of the form

n , $(n + 1)$ and $(n + 2)$, where n is any natural number, i.e., $n = 1, 2, 3, \dots$

Let $a = n$, $b = n + 1$ and $c = n + 2$

$\therefore (a, b, c) = (n, n + 1, n + 2)$, where $n = 1, 2, 3, \dots$

$$\text{At } n = 1; \quad (a, b, c) = (1, 1 + 1, 1 + 2) = (1, 2, 3)$$

$$\text{At } n = 2; \quad (a, b, c) = (2, 2 + 1, 2 + 2) = (2, 3, 4)$$

$$\text{At } n = 3; \quad (a, b, c) = (3, 3 + 1, 3 + 2) = (3, 4, 5)$$

$$\text{At } n = 4; \quad (a, b, c) = (4, 4 + 1, 4 + 2) = (4, 5, 6)$$

$$\text{At } n = 5; \quad (a, b, c) = (5, 5 + 1, 5 + 2) = (5, 6, 7)$$

$$\text{At } n = 6; \quad (a, b, c) = (6, 6 + 1, 6 + 2) = (6, 7, 8)$$

$$\text{At } n = 7; \quad (a, b, c) = (7, 7 + 1, 7 + 2) = (7, 8, 9)$$

$$\text{At } n = 8; \quad (a, b, c) = (8, 8 + 1, 8 + 2) = (8, 9, 10)$$

We observe that each set (a, b, c) consist of one and only one number which is divisible by 3.

Hence, one of any three consecutive positive integers must be divisible by 3.

