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## CBSE Class 10- Mathematics: Chapter – 1 Real Numbers Part 1

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### 1 Marks Questions

**Question 1:** Use Euclid Division lemma to show that the square of any positive integer is either of form  $3m$  or  $3m + 1$  for some integer  $m$ .

[Hint: Let  $x$  be any positive integer then it is of the form  $3q, 3q + 1$  or  $3q + 2$ . Now square each of these and show that they can be rewritten in the form  $3m$  or  $3m + 1$ .]

**Answer:**

Let  $a$  be any positive integer and  $b = 3$ .

The  $a = 3q + r$  for some integer  $q \geq 0$

And  $r = 0, 1, 2$  because  $0 \leq r < 3$

Therefore,  $a = 3q$  or  $3q + 1$  or  $3q + 2$

Or,

$$\begin{aligned} a^2 &= (3q)^2 \text{ or } (3q + 1)^2 \text{ or } (3q + 2)^2 \\ a^2 &= (9q)^2 \text{ or } 9q^2 + 6q + 1 \text{ or } 9q^2 + 12q + 4 \\ &= 3 \times (3q^2) \text{ or } 3(3q^2 + 2q) + 1 \text{ or } 3(3q^2 + 4q + 1) + 1 \\ &= 3k_1 \text{ or } 3k_2 + 1 \text{ or } 3k_3 + 1 \end{aligned}$$

Where  $k_1, k_2$  and  $k_3$  are some positive integers?

Hence, it can be said the square of any positive integer is either of the form  $3m$  or  $3m + 1$ .

**Question 2:**

Express each number as product of its prime factors:

(i) 140

(i) 156

(iv) 5005

(v) 7429

**Answer:**

(i)  $140 = 2 \times 2 \times 5 \times 7 = 2^2 \times 5 \times 7$

(ii)  $156 = 2 \times 2 \times 3 \times 13 = 2^2 \times 3 \times 13$

$$(iii) \quad 3825 = 3 \times 3 \times 5 \times 5 \times 17 = 3^2 \times 5^2 \times 17$$

$$(iv) \quad 5005 = 5 \times 7 \times 11 \times 13$$

**Question 3:**

Given that  $HCF(306, 657) = 9$ , find  $LCM(306, 657)$

**Answer:**

$$HCF(306, 657) = 9$$

We know that  $LCM \times HCF = \text{Product of two numbers}$

$$LCM = \frac{306 \times 657}{HCF} = \frac{306 \times 657}{9}$$

$$LCM = 22338$$

**Question 4:**

Check whether  $6^n$  can end with the digit 0 for any natural number

**Answer:**

If any number ends with the digit 0, it should be divisible by 10.

In other words, it will also be divisible by 2 and 5 as  $10 = 2 \times 5$

Prime Factorization of  $6^n = (2 \times 3)^n$

It can be observed that 5 is not in the prime factorisation of  $6^n$

Hence, for any value of  $n$ ,  $6^n$  will not be divisible by 10.

Therefore,  $6^n$  cannot end with the digit 0 for any natural number  $n$ .

**Question 5:**

Prove that  $(\sqrt[3+2]{5})$  is Irrational

**Answer:**

Let us say  $\sqrt[3+2]{5}$  is rational.

Then the co-prime  $x$  and  $y$  of the given rational number where  $(y \neq 0)$  is such that:

$$\sqrt[3+2]{5} = x/y$$

Rearranging, we get,

$$2\sqrt{5} = x/y - 3$$

$$\sqrt{5} = \frac{1}{2} \left( \frac{x}{y} - 3 \right)$$

Since  $x$  and  $y$  are integers, thus,  $\frac{1}{2} \left( \frac{x}{y} - 3 \right)$  is a rational number.

Therefore,  $\sqrt{5}$  is also a rational number. But this confronts the fact that  $\sqrt{5}$  is irrational.

Hence, we get that  $\sqrt[3+2]{5}$  is irrational.

**Question 6:**

$7 \times 11 \times 13 \times +15$  is a

- (a) Composite number
- (b) Whole number
- (c) Prime number
- (d) None of these

**Answer:**

(a) and (b) both