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

1 Marks Questions

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

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

Answer:

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

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

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

Therefore, $a=3q \text{or} 3q+1$ or $3q+2$

Or,

$$a^2=(3q)^2 \text{or} (3q+1)^2 \text{or} (3q+2)^2$$

$$a^2=(9q)^2 \text{or} 9q^2+6q+1 \text{or} 9q^2+12q+4$$

$$=3\times\left(3q^2\right) \text{or} 3\left(3q^2+2q\right)+1 \text{or} 3\left(3q^2+4q+1\right)+1$$

$$=3k_1 \text{or} 3k_2+1 \text{or} 3k_3+1$$

Where $k_1, k_2 \text{and} k_3$ are some positive integers?

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

Question 2:

Express each number as product of its prime factors:

(i) 140

(i) 156

(iv) 5005

(v) 7429

Answer:

(i) $140=2\times2\times5\times7=2^2\times5\times7$

(ii) $156=2\times2\times31=2^2\times3\times13$

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

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

Question 3:

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

Answer:

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

We know that $LCM \times HCF =$ 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 for any natural number

Answer:

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

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

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

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

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

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

Question 5:

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

Answer:

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

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

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

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 $3+2\sqrt{5}$ 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