REAL NUMBER CLASS 10

IMPORTANT MCQ FOR BOARD 2024-25

Q1: The ratio of HCF to LCM of the least composite number and the least prime number is [2023, 1 Mark]

(a) 1 : 2

(b) 2 : 1

(c) 1 : 1

(d) 1 :

Q2; If HCF (39, 91) = 31, then LCM (39, 91) is : [2021, 1 Mark]

(a) 91 (b) 273 (c) 39 (d) 3549

Q3: If 'n' is any natural number, then (12)^n cannot end with the digit [2022, 1 Mark]

(a) 2

(b) 4

(c) 8

(d) 0

[2022, 1 Mark]

Q4: Two positive numbers have their HCF as 12 and their product as 6336. The number of pairs possible for the numbers, is [2024, 1 Mark]

(a) 2

(b) 3

(c) 4

(d) 1 [2022, 1 Mark]

Q5: The number 385 can be expressed as the product of prime factors as [2022, 1 Mark]

(a) 5 x 11 x 1 3

(b) 5 x 7 x 11

(c) 5 x 7 x 1 3

(d) 5 x 11 x 1 7

Q6; The total number of factor of prime number is;

a.1 b.2 c.3 d.0

Q7; THE HCF AND LCM OF 12,21,5 is;

a.3,140

b.12,420

c.3,420

d.420,3

Q8. THE LCM OF TWO NUMBER IS 182 AND THEIR HCF IS 13. IF ONE OF THE NUMBER IS 26. FIND THE OTHER NUMBER.

A.91

B.81

C.62

D.54

Q9.The HCF of two number a and b is 5 and their LCM is 200.Find product of ab.

A.1000

B.500

C.400

D.250

Q10. IF HCF OF 65 AND 117 is expressible in the form 65n-117, find value of n.

A.2

B.3

C.4

D.5

11.Find the largest number which divides 70 and 125 leaving remainder 5 and 8 respectively. (2015)

1.13 2.12 3.11 4.15

12.If two positive integers p and q can be expressed as p = ab^2 and q = a^3b; where a, b being prime numbers, then LCM (p, q) is equal to

(a) ab

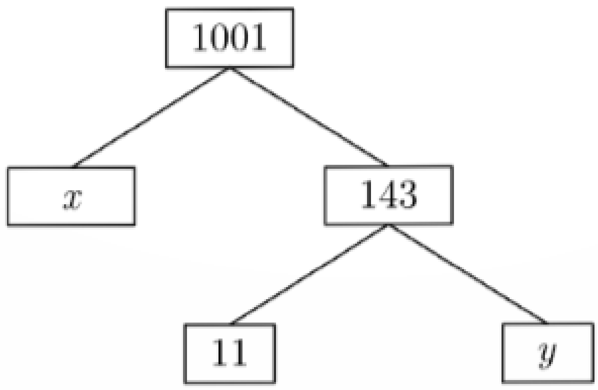
(b) a^2b^2

(c) a^3b^2

(d) a^3b^3

13.

18. The values of x and y in the given figure are



(a) 7, 13 (b) 13, 7

(c) 9, 12 (d) 12, 9

14.Assertion : The HCF of two numbers is 5 and their product is 150, then their LCM is 30
Reason : For any two positive integers a and b, HCF(a, b) + LCM(a, b) = a × b.
(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).
(c) Assertion (A) is true but reason (R) is false.
(d) Assertion (A) is false but reason (R) is true.

IMPORTANT SUBJECTIVE QUESTION FOR BOARD EXAM

Q4: Prove that √3 is an irrational number. [2023, 3 Marks]

Ans: Let us assume that √3 is a rational number.

Then √3 = a/b; where a and b (≠ 0) are co-prime positive integers.

Squaring on both sides, we get

$3 = a^2/b^2 \Rightarrow a^2 = 3b^2$

$\Rightarrow$ 3 divides a^2

$\Rightarrow$ 3 divides a _______(i)

= a = 3c, where c is an integer

Again, squaring on both sides, we get

$a^2 = 9c^2$

$\Rightarrow 3b^2 = 9c^2 \Rightarrow b^2 = 3c^2 \Rightarrow$ 3 divides b^2

$\Rightarrow$ 3 divides b _______(ii)

From (i) and (ii), we get 3 divides both a and b.

⇒ a and b are not co- prime integers.

This contradicts the fact that a and b are co-primes.

Hence, √3 is an irrational number.

Q4: Show that 5 + 2 √7 is an irrational number, where √7 is given to be an irrational number. [2020, 2 Marks]

Ans: Suppose 5 + 2√7 is a rational number.

∴ We can find two integers a, b (b ≠ 0) such that

$5+2\sqrt{7}=\frac{a}{b}$, , where a and b are co-prime,

$2\sqrt{7}=\frac{a}{b}-5 \Rightarrow \sqrt{7}=\frac{1}{2}\left[\frac{a}{b}-5\right]$

⇒ √7 is a rational number

[∵ a, b are integers, so $\frac{1}{2}\left(\frac{a}{b}-5\right)$ is a rational number]

But this contradicts the fact that √7 is an irrational number.

Hence, our assumption is wrong.

Thus. 5 + 2√7 is an irrational number.

Q6: Show that $\frac{3+\sqrt{7}}{5}$ is an irrational number, where √7 is given to be an irrational number. [2019, 2 Marks]

Ans: Suppose $\frac{3+\sqrt{7}}{5}$ is a rational number

∴ We can find two integers p and q (p ≠ 0) such that $\frac{3+\sqrt{7}}{5}$ = p/q, where p and q are co-prime.

$$\Rightarrow \quad 3+\sqrt{7}=\frac{5p}{q}$$

$$\Rightarrow \quad \sqrt{7}=\frac{5p}{q}-3$$

⇒ √7 is a rational number.

[∵ p, q are integers, so $\frac{5p}{q}-3$ is a rational number]

But this contradicts the fact that √7 is an irrational number.

Hence, our supposition is wrong.

Thus $\frac{3+\sqrt{7}}{5}$ is an irrational number.

Q7: Prove that √5 is an irrational number. **[2019, 3 Marks]**

Ans: Let us assume that √5 is a rational number.

Then √5 = a/b where a and b (≠ 0} are co-prime integers,

if Squaring on both sides, we get

$$5 = \frac{a^2}{b^2} \Rightarrow a^2 = 5b^2$$

⇒ 5 divides a^2

⇒ 5 divides a ----------(i)

⇒ a = 5c, where c is an integer

Again, squaring on both sides, we get

$a^2 = 25c^2$

$\Rightarrow 5b^2 = 25c^2 \Rightarrow b^2 = 5c^2$

⇒ 5 divides b^2 ----------(ii)

⇒ 5 divides b

From (i) and {ii), we get 5 divides both a and b.

⇒ a and b are not co-prime integers.

Hence, our supposition is wrong.

Thus, √5 is an irrational number.

Q8: Prove that √2 is an irrational number. [2019, 3 Marks]

Ans: Let us assume √2 be a rational number.

Then, √2 = p/q where p, q (q ≠ 0) are integers and co-prime. ;

On squaring both sides. we get

$2 = \frac{p^2}{q^2} \Rightarrow p^2 = 2q^2$ ------------(i)

⇒ 2 divides p^2

⇒ 2 divides p -----------(ii)

So, p = 2a, where a is some integer.

Again squaring on both sides, we get

$p^2 = 4a^2$

$\Rightarrow 2q^2 = 4a^2$ (using (i))

$\Rightarrow q^2 = 2a^2$

⇒ 2 divides q^2

⇒ 2 divides q -----------(iii)

From (ii) and (iii), we get

2 divides both p and q.

∴ p and q are not co-prime integers.

Hence, our assumption is wrong.

Thus √2 is an irrational number.

Q9: Prove that $2 + 5\sqrt{3}$ is an irrational number given that $\sqrt{3}$ is an irrational number. [2019, 3 Marks]

Ans: Suppose $2 + 5\sqrt{3}$ is a rational number.

We can find two integers a, b ($b \neq 0$) such that

$2 + 5\sqrt{3} = a/b$, where a and b are co -prime integers.

$$\Rightarrow \quad 5\sqrt{3} = \frac{a}{b} - 2 \Rightarrow \sqrt{3} = \frac{1}{5}\left[\frac{a}{b} - 2\right]$$

$\Rightarrow \sqrt{3}$ is a rational number.

[$\because$ a, b are integers, so $\frac{1}{5}\left[\frac{a}{b} - 2\right]$ is a rational number]

But this contradicts the fact that $\sqrt{3}$ is an irrational number.

Hence, our assumption is wrong.

Thus, $2 + 5\sqrt{3}$ is an irrational number.

59. Find HCF and LCM of 404 and 96 and verify that HCF $\times$ LCM = Product of the two given numbers.

Ans : [Board 2018]

We have

$$404 = 2 \times 2 \times 101$$
$$= 2^2 \times 101$$
$$96 = 2 \times 2 \times 2 \times 2 \times 2 \times 3$$
$$= 2^5 \times 3$$
$$\text{HCF}(404, 96) = 2^2 = 4$$
$$\text{LCM}(404, 96) = 101 \times 2^5 \times 3 = 9696$$
$$\text{HCF} \times \text{LCM} = 4 \times 9696 = 38784$$

Also, $404 \times 96 = 38784$

Hence, HCF $\times$ LCM = Product of 404 and 96

78. Write a rational number between $\sqrt{2}$ and $\sqrt{3}$.

Ans : [K.V.S.]

We have $\sqrt{2} = \sqrt{\frac{200}{100}}$ and $\sqrt{3} = \sqrt{\frac{300}{100}}$

We need to find a rational number x such that

$$\frac{1}{10}\sqrt{200} < x < \frac{1}{10}\sqrt{300}$$

Choosing any perfect square such as 225 or 256 in between 200 and 300, we have

$$x = \sqrt{\frac{225}{100}} = \frac{15}{10} = \frac{5}{3}$$

Similarly if we choose 256, then we have

$$x = \sqrt{\frac{256}{100}} = \frac{16}{10} = \frac{8}{5}$$