Class 10 Maths: Chapter 1 - Real Numbers

Most Important Questions Bank (Based on Latest Pattern)

General Instructions

- This practice paper contains the most frequently asked and important questions from the chapter **Real Numbers**.
- The questions are divided into four sections: Objective Type (1 Mark), Very Short Answer (2 Marks), Short Answer (3 Marks), and Long Answer / Word Problems (4/5 Marks).
- Attempt all questions to thoroughly prepare for your upcoming examinations.
- An answer key with hints is provided at the end of the document for self-evaluation.

Section A: Objective Type Questions (1 Mark Each)

1. The HCF of 96 and 404 is:

(a) 120
(b) 4
(c) 10
(d) 3

2. If p and q are two distinct prime numbers, then their HCF is:

(a) p
(b) q
(c) $p \times q$
(d) 1

3. Find the LCM of the smallest two-digit composite number and the smallest composite number.

4. Express 156 as a product of its prime factors.

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

Section B: Very Short Answer Type Questions (2 Marks Each)

6. Find the HCF and LCM of 90 and 144 by the prime factorization method.

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

8. Explain why $7 \times 11 \times 13 + 13$ and $7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1 + 5$ are composite numbers.

9. Two numbers are in the ratio 21:17. If their HCF is 5, find the numbers.

Section C: Short Answer Type Questions (3 Marks Each)

10. Prove that $\sqrt{3}$ is an irrational number.

11. Prove that $5 - 2\sqrt{3}$ is an irrational number, given that $\sqrt{3}$ is irrational.

12. Find the largest number which divides 70 and 125, leaving remainders 5 and 8, respectively.

13. The length, breadth, and height of a room are 8m 50cm, 6m 25cm, and 4m 75cm respectively. Find the length of the longest rod that can measure the dimensions of the room exactly.

Section D: Long Answer / Application Based Questions (4/5 Marks Each)

14. Three bells toll at intervals of 12 minutes, 15 minutes, and 18 minutes respectively. If they start tolling together, after what time will they next toll together?

15. In a morning walk, three persons step off together. Their steps measure 80 cm, 85 cm, and 90 cm respectively. What is the minimum distance each should walk so that all can cover the same distance in complete steps?

16. Prove that if x and y are both odd positive integers, then $x^2 + y^2$ is even but not divisible by 4.

Answer Key & Hints

Section A

1. **(b) 4**. (Prime factorization of $96 = 2^5 \times 3$, $404 = 2^2 \times 101$. HCF $= 2^2 = 4$).

2. **(d) 1**. (Distinct prime numbers have no common factors other than 1).

3. **20**. (Smallest 2-digit composite number = 10, smallest composite number = 4. LCM of 10 and 4 is 20).

4. $2^2 \times 3 \times 13$.

5. **22338**. (Using the formula: HCF $\times$ LCM = Product of the two numbers. LCM $= \frac{306 \times 657}{9}$).

Section B

6. **HCF = 18, LCM = 720**. ($90 = 2 \times 3^2 \times 5$; $144 = 2^4 \times 3^2$. HCF $= 2 \times 3^2 = 18$. LCM $= 2^4 \times 3^2 \times 5 = 720$).

7. **No**. (For a number to end with digit 0, its prime factorization must contain both 2 and 5. $6^n = (2 \times 3)^n = 2^n \times 3^n$. Since 5 is not a prime factor, it cannot end with 0).

8. Take out common factors. $13(7 \times 11 + 1) = 13 \times 78$. Since it has factors other than 1 and itself, it is composite. Similarly, take 5 common in the second expression.

9. **105 and 85**. (Let numbers be $21x$ and $17x$. Their HCF is x. Given HCF = 5. So, numbers are 21×5 and 17×5).

Section C

10. **Proof:** Let us assume, to the contrary, that $\sqrt{3}$ is rational. That is, we can find coprime integers a and b ($b \neq 0$) such that $\sqrt{3} = \frac{a}{b}$. Squaring both sides, $3 = \frac{a^2}{b^2} \implies a^2 = 3b^2$. This means 3 divides a^2, hence 3 divides a. Let $a = 3c$. Then $(3c)^2 = 3b^2 \implies 9c^2 = 3b^2 \implies b^2 = 3c^2$. This means 3 divides b^2, hence 3 divides b. Therefore, a and b have at least 3 as a common factor. This contradicts the fact that a and b are coprime. This contradiction has arisen because of our incorrect assumption. So, $\sqrt{3}$ is irrational.

11. **Proof:** Assume $5 - 2\sqrt{3}$ is rational. Let $5 - 2\sqrt{3} = \frac{p}{q}$ (p, q are integers, $q \neq 0$). Rearranging, we get $\sqrt{3} = \frac{5q-p}{2q}$. Since p, q are integers, $\frac{5q-p}{2q}$ is rational, which implies $\sqrt{3}$ is rational. This contradicts the given fact that $\sqrt{3}$ is irrational. Hence, $5 - 2\sqrt{3}$ is irrational.

12. **13**. (Required number is the HCF of $(70 - 5)$ and $(125 - 8)$, i.e., HCF of 65 and 117. $65 = 5 \times 13$, $117 = 3^2 \times 13$. HCF = 13).

13. **25 cm**. (Convert to cm: 850 cm, 625 cm, 475 cm. The longest rod will be the HCF of 850, 625, and 475. HCF = 25).

Section D

14. **180 minutes or 3 hours**. (Find the LCM of 12, 15, and 18. $12 = 2^2 \times 3$; $15 = 3 \times 5$; $18 = 2 \times 3^2$. LCM $= 2^2 \times 3^2 \times 5 = 180$. They will toll together after 180 minutes).

15. **12240 cm or 122.4 m**. (Find the LCM of 80, 85, and 90. $80 = 2^4 \times 5$; $85 = 5 \times 17$; $90 = 2 \times 3^2 \times 5$. LCM $= 2^4 \times 3^2 \times 5 \times 17 = 12240$).

16. **Proof:** Let $x = 2m + 1$ and $y = 2n + 1$ be two odd positive integers. Then, $x^2 + y^2 = (2m + 1)^2 + (2n + 1)^2 = 4m^2 + 4m + 1 + 4n^2 + 4n + 1 = 4(m^2 + m + n^2 + n) + 2$. Let $k = m^2 + m + n^2 + n$, which is an integer. So, $x^2 + y^2 = 4k + 2 = 2(2k + 1)$. This shows $x^2 + y^2$ is an even number (as it is a multiple of 2), but when divided by 4, it leaves a remainder of 2. Hence, it is not divisible by 4.