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Real Numbers — CBSE Class 10 Mathematics Chapter Test

FREE CHAPTER TEST · CLASS X · MATHEMATICS (041) · PATTERN OF THE CBSE SAMPLE QUESTION PAPER 2026-27

TIME ALLOWED	MAXIMUM MARKS	QUESTIONS	NAME / ROLL NO.
1½ hours	40	19 (A 10 · B 3 · C 2 · D 2 · E 2)	

GENERAL INSTRUCTIONS

Read the following instructions very carefully and strictly follow them:

1. This question paper contains 19 questions. All questions are compulsory.
2. This question paper is divided into five sections: A, B, C, D and E.
3. In Section A, Questions 1 to 8 are multiple choice questions (MCQs) and Questions 9 and 10 are assertion-reason based questions of 1 mark each.
4. In Section B, Q11–13 are very short answer (VSA) type questions, carrying 2 marks each.
5. In Section C, Q14–15 are short answer (SA) type questions, carrying 3 marks each.
6. In Section D, Q16–17 are long answer (LA) type questions, carrying 5 marks each.
7. In Section E, Q18–19 are case study based questions, carrying 4 marks each, with sub-parts of the values of 1, 1 and 2 marks.
8. There is no overall choice. However, an internal choice has been provided in 1 question of Section B, 1 question of Section C, 1 question of Section D and in the 2-mark sub-part of each question of Section E.
9. Use of calculators is not allowed.
10. This chapter test follows the section structure, question types and marks per question of the CBSE Class X Mathematics (Standard, 041) Sample Question Paper 2026-27, at half the length of the 80-mark board paper: 40 marks in 1½ hours.
11. The answer key and the marking scheme are at the end of this booklet. Attempt the paper in 1½ hours before you look at them.

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Chapter: Real Numbers · **Topics:** Fundamental Theorem of Arithmetic · HCF and LCM by prime factorisation · HCF × LCM = product · Irrational numbers · Word problems on HCF and LCM

SECTION A

This section comprises 10 questions of 1 mark each: 8 multiple choice questions (MCQs) and 2 assertion-reason based questions.

1. The HCF of 84 and 308 is 1

(A) 14 (B) 28

(C) 42 (D) 7

2. The LCM of 8, 36 and 90 is 1

(A) 720 (B) 180

(C) 360 (D) 1440

3. The HCF of two numbers is 12 and their product is 2160. Their LCM is 1

(A) 180 (B) 2148

(C) 25920 (D) 216

4. The prime factorisation of 156 is 1

(A) $2 \times 3 \times 26$ (B) $2^2 \times 39$

(C) 2×78 (D) $2^2 \times 3 \times 13$

5. For how many natural numbers n does 9^n end with the digit 0? 1

(A) exactly one (B) none

(C) infinitely many (D) exactly two

6. The HCF of two consecutive natural numbers is always 1

(A) their difference squared (B) 0

(C) 1 (D) the smaller number

7. The smallest number divisible by every one of the numbers 1 to 10 is 1

(A) 2520 (B) 5040

(C) 3628800 (D) 1260

8. Which of the following is irrational? 1

(A) $\sqrt{\frac{9}{4}}$ (B) 0.333…

(C) 1.2 (D) $\sqrt{12}$

9. **Assertion (A):** $5 + 3\sqrt{2}$ is irrational. 1

Reason (R): The sum of a rational number and an irrational number is irrational.

(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.

10. **Assertion (A):** For any three positive integers p, q and r, HCF(p, q, r) × LCM(p, q, r) = p × q × r. 1
Reason (R): 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.

SECTION B

This section comprises 3 very short answer (VSA) type questions of 2 marks each.

11. (a) Find the HCF and LCM of 34 and 85 by prime factorisation, and verify that HCF × LCM = product of the numbers. 2

OR

(b) Check whether 12^n can end with the digit 0 for any natural number n.

12. Two tanks contain 1050 litres and 1260 litres of milk. Find the maximum capacity of a container that can measure the milk of either tank an exact number of times. 2

13. Express 4620 as a product of its prime factors. 2

SECTION C

This section comprises 2 short answer (SA) type questions of 3 marks each.

14. (a) Prove that √7 is irrational. 3

OR

(b) Given that √7 is irrational, prove that 4 − 3√7 is irrational.

15. Find the HCF and LCM of 16, 20 and 28 by the prime factorisation method. 3

SECTION D

This section comprises 2 long answer (LA) type questions of 5 marks each.

16. (a) Three bells ring at intervals of 9, 12 and 15 minutes. They ring together at 8 a.m. (i) When will they next ring together? (ii) How many times will they ring together from 8 a.m. to 11 a.m., both included? (iii) Find the least number which, when divided by 9, 12 and 15, leaves a remainder of 2 in each case. 5

OR

(b) Prove that √11 is irrational. Hence prove that 5 − 2√11 is irrational.

17. (i) A group of 518 students is to march behind a school band of 42 members in a parade. The two groups are to march in the same number of columns. What is the maximum number of columns? (ii) Find the least number of identical square tiles needed to pave a floor 7 m 82 cm long and 5 m 78 cm wide. 5

SECTION E

This section comprises 2 case study based questions of 4 marks each, with sub-parts of 1, 1 and 2 marks.

18. A gardener has 60 rose plants, 84 marigold plants and 108 tulip plants. He wants to plant them in rows so that every row has the same number of plants and each row has plants of one kind only.

(i) Write 108 as a product of primes. [1]

(ii) Find the maximum number of plants in a row. [1]

(iii) Find the least number of rows needed. [2]

OR

(iii) Find the LCM of 60, 84 and 108. [2]

19. At a road crossing, three traffic lights change after every 48 seconds, 72 seconds and 108 seconds. They change together at 7 a.m.

(i) Write the prime factorisation of 72. [1]

(ii) Find the HCF of 48, 72 and 108. [1]

(iii) At what time will they next change together? [2]

OR

(iii) How many times will they change together in the hour after 7 a.m. (not counting 7 a.m.)? [2]

END OF THE QUESTION PAPER

ANSWER KEY — SECTION A

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
(B)	(C)	(A)	(D)	(B)	(C)	(A)	(D)	(A)	(D)

MARKING SCHEME AND WORKED SOLUTIONS

Marks for each step are shown in brackets, as in the CBSE marking scheme. Any correct alternative method earns full marks.

Q1. Answer (B). $84 = 2^2 \times 3 \times 7$, $308 = 2^2 \times 7 \times 11$; HCF $= 2^2 \times 7 = 28$.

Q2. Answer (C). $8 = 2^3$, $36 = 2^2 \times 3^2$, $90 = 2 \times 3^2 \times 5$; LCM $= 2^3 \times 3^2 \times 5 = 360$.

Q3. Answer (A). LCM = product/HCF = 2160/12 = 180 (for example 36 and 60).

Q4. Answer (D). $156 = 4 \times 39 = 2^2 \times 3 \times 13$.

Q5. Answer (B). $9^n = 3^{2n}$ has no prime factor 2 or 5, so it is never divisible by 10.

Q6. Answer (C). Any common divisor divides their difference, 1.

Q7. Answer (A). LCM$(1, \ldots, 10) = 2^3 \times 3^2 \times 5 \times 7 = 2520$.

Q8. Answer (D). $\sqrt{(9/4)} = 3/2$; $0.333\ldots = 1/3$; $1.2 = 6/5$; $\sqrt{12} = 2\sqrt{3}$ is irrational.

Q9. Answer (A). $3\sqrt{2}$ is irrational ($\sqrt{2}$ is), and adding the rational 5 keeps it irrational — exactly the reason given. Answer (A).

Q10. Answer (D). R is true. A is false: for 6, 15, 20, HCF × LCM = 1 × 60 = 60 ≠ 1800. Answer (D).

Q11. (2 marks) Answer: (a) HCF 17, LCM 170; (b) no.
(a) $34 = 2 \times 17$, $85 = 5 \times 17$; HCF = 17, LCM $= 2 \times 5 \times 17 = 170$. [1] HCF × LCM $= 17 \times 170 = 2890 = 34 \times 85$. [1]
OR (b) $12^n = 2^{2n} \times 3^n$. [1] A number ending in 0 is divisible by $10 = 2 \times 5$, so its prime factors include 5; 12^n has no prime factor 5 (Fundamental Theorem of Arithmetic), so 12^n never ends in 0. [1]

Q12. (2 marks) Answer: 210 litres.
$1050 = 2 \times 3 \times 5^2 \times 7$, $1260 = 2^2 \times 3^2 \times 5 \times 7$. [1] Required capacity = HCF $= 2 \times 3 \times 5 \times 7 = 210$ litres. [1]

Q13. (2 marks) Answer: $2^2 \times 3 \times 5 \times 7 \times 11$.
$4620 = 2 \times 2310 = 2^2 \times 1155 = 2^2 \times 3 \times 385$ [1] $= 2^2 \times 3 \times 5 \times 7 \times 11$. [1]

Q14. (3 marks) Answer: proof by contradiction.
(a) Suppose $\sqrt{7} = a/b$, with a, b coprime integers, $b \neq 0$. [½] Then $7b^2 = a^2$, so 7 divides a^2, hence 7 divides a (7 is prime). [1] Write $a = 7c$: $7b^2 = 49c^2$, $b^2 = 7c^2$, so 7 divides b. [1] Then 7 divides both a and b, contradicting that they are coprime; so $\sqrt{7}$ is irrational. [½]
OR (b) Suppose $4 - 3\sqrt{7} = r$, rational. [1] Then $\sqrt{7} = (4 - r)/3$, which is rational, [1] contradicting the fact that $\sqrt{7}$ is irrational; hence $4 - 3\sqrt{7}$ is irrational. [1]

Q15. (3 marks) Answer: HCF 4, LCM 560.
$16 = 2^4$, $20 = 2^2 \times 5$, $28 = 2^2 \times 7$. [1] HCF $= 2^2 = 4$ (the only common prime, lowest power). [1] LCM $= 2^4 \times 5 \times 7 = 560$. [1]

Q16. (5 marks) Answer: (a) 11 a.m.; 2 times; 182; (b) proofs.
(a) $9 = 3^2$, $12 = 2^2 \times 3$, $15 = 3 \times 5$; LCM $= 2^2 \times 3^2 \times 5 = 180$. [1] (i) 180 minutes = 3 hours later: 11 a.m. [1] (ii) At 8 a.m. and 11 a.m.: 2 times. [1] (iii) LCM + 2 = 182. [2]
OR (b) Suppose $\sqrt{11} = a/b$, a, b coprime; then $11b^2 = a^2$, so 11 divides a; $a = 11c$ gives $b^2 = 11c^2$, so 11 divides b — a contradiction; $\sqrt{11}$ is irrational. [3] If $5 - 2\sqrt{11} = r$ were rational, then $\sqrt{11} = (5 - r)/2$ would be rational — a contradiction; so $5 - 2\sqrt{11}$ is irrational. [2]

Q17. (5 marks) Answer: (i) 14; (ii) 391 tiles of side 34 cm.
(i) $518 = 2 \times 7 \times 37$, $42 = 2 \times 3 \times 7$; maximum columns = HCF = $2 \times 7 = 14$. [2]
(ii) In cm: $782 = 2 \times 17 \times 23$, $578 = 2 \times 17^2$; side of the largest tile = HCF = $2 \times 17 = 34$ cm. [1½] Number of tiles = $(782 \times 578)/(34 \times 34) = 23 \times 17 = 391$. [1½]

Q18. (4 marks) Answer: (i) $2^2 \times 3^3$; (ii) 12; (iii) 21 rows, or 3780.
(i) $108 = 2^2 \times 3^3$. [1]
(ii) $60 = 2^2 \times 3 \times 5$, $84 = 2^2 \times 3 \times 7$; HCF = $2^2 \times 3 = 12$. [1]
(iii)(a) 60/12 + 84/12 + 108/12 [1] = 5 + 7 + 9 = 21 rows. [1]
OR (iii)(b) LCM = $2^2 \times 3^3 \times 5 \times 7$ [1] = 3780. [1]

Q19. (4 marks) Answer: (i) $2^3 \times 3^2$; (ii) 12; (iii) 7:07:12 a.m., or 8 times.
(i) $72 = 2^3 \times 3^2$. [1]
(ii) $48 = 2^4 \times 3$, $108 = 2^2 \times 3^3$; HCF = $2^2 \times 3 = 12$. [1]
(iii)(a) LCM = $2^4 \times 3^3 = 432$ s = 7 min 12 s [1]; at 7:07:12 a.m. [1]
OR (iii)(b) Every 432 s; 3600/432 = 8.33… [1], so 8 times. [1]

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