

MATHEMATICS

REAL NUMBERS

1. Find the sum of all the two digit natural numbers when are divisible by 4. (CBSE 2005-06, 3 marks)
2. Find the sum of all three digit whole numbers which are multiplies of 7. (CBSE 2006-07, 2 marks)
3. Complete the missing entries in the following factor tree: (CBSE 2007-08, 1 mark)

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graph LR; A[ ] --- B[2]; A --- C[ ]; C --- D[3]; C --- E[7]
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4. Use Euclid's Division Lemma to show that the square of any positive integer is either of the form $3m$ or $(3m + 1)$ for some integer m . (CBSE 2007-08, 3 marks)
5. The decimal expansion of the rational number $\frac{43}{2^4 \cdot 5^3}$, will terminate after how many places of decimals? (CBSE 2008-09, 1 mark)
6. Which of the following numbers has terminating decimal expansion? (CBSE 2009-10, 1 mark)
(A) $\frac{37}{45}$ (B) $\frac{21}{2^3 5^6}$
(C) $\frac{17}{49}$ (D) $\frac{89}{2^2 3^2}$
7. The $[HCF \times LCM]$ for the numbers 50 and 20 is (CBSE 2009-10, 1 mark)
(A) 10 (B) 100
(C) 1000 (D) 50
8. Check whether 6^n can end with the digit 0, for any natural number n ? (CBSE 2009-10, 2 marks)
9. Prove that $\sqrt{7}$ is an irrational number. (CBSE 2009-10, 3 marks)
10. Prove that $3 + \sqrt{5}$ is an irrational number. (CBSE 2009-10, 3 marks)
11. Use Euclid's division algorithm to find the HCF of 10224 and 9648. (CBSE 2009-10, 3 marks)
12. H.C.F. of two consecutive even numbers is: (CBSE 2010-11, 1 mark)
(A) 0 (B) 1
(C) 4 (D) 2
13. If the HCF of 85 and 153 is expressible in the form $85n - 153$, then value of n is: (CBSE 2010-11, 1 mark)
(A) 3 (B) 2
(C) 4 (D) 1

14. Show that 4^n can never end with the digit zero for any natural number n . (CBSE 2010-11, 3 marks)
15. If d is the HCF of 45 and 27, find x, y satisfying $d = 27x + 45y$ (CBSE 2010-11, 3 marks)
16. Prove that $\frac{2\sqrt{3}}{5}$ is an irrational number. (CBSE 2010-11, 3 marks)
17. Find the sum of first 40 positive integers divisible by 6. (CBSE 2011-12, 3 marks)
18. How many three – digit natural numbers are divisible by 7? (CBSE 2012-13, 2 marks)
19. Find the value of $(-1)^n + (-1)^{2n} + (-1)^{2n+1} + (-1)^{4n+2}$, where n is any positive odd integer. (CBSE 2013-14, 2 marks)
20. Determine the values of m and n so that the prime factorization of 10500 is expressible as $2^m \times 3 \times 5^n \times 7$ (CBSE 2013-14, 2 marks)
21. Prove that $\sqrt{8}$ is an irrational number. (CBSE 2013-14, 3 marks)
22. State Euclid division Lemma. Using its show that square of any positive integer is either of the form $5m$ or $5m \pm 1$, where m is an integer. (CBSE 2013-14, 4 marks)
23. Find the prime factorization of the denominator of the rational number equivalent to 8.39. (CBSE 2014-15, 2 marks)
24. Show that $5\sqrt{6}$ is an irrational number (CBSE 2014-15, 2 marks)
25. Use Euclid division lemma to show that square of any positive integer cannot be of the form $5m+2$ or $5m+3$ for some integer m . (CBSE 2014-15, 3 marks)
26. Can the number 6^n , n being a natural number, end with the digit 5? Give reasons. (CBSE 2014-15, 4 marks)
27. Find how many integers between 200 and 500 are divisible by 8. (CBSE 2016-17, 2 marks)
28. What is the HCF of smallest prime number and the smallest composite number? (CBSE 2017-18, 1 mark)
29. Given that $\sqrt{2}$ is irrational, prove that $(5 + 3\sqrt{2})$ is an irrational number. (CBSE 2017-18, 2 marks)
30. Find the sum of first 8 multiples of 3. (CBSE 2017-18, 2 marks)
31. Find HCF and LCM of 404 and 96 and verify that $\text{HCF} \times \text{LCM} = \text{Product of the two given numbers}$. (CBSE 2017-18, 3 marks)
32. Find a rational number between $\sqrt{2}$ and $\sqrt{3}$. (CBSE 2018-19, 1 mark)



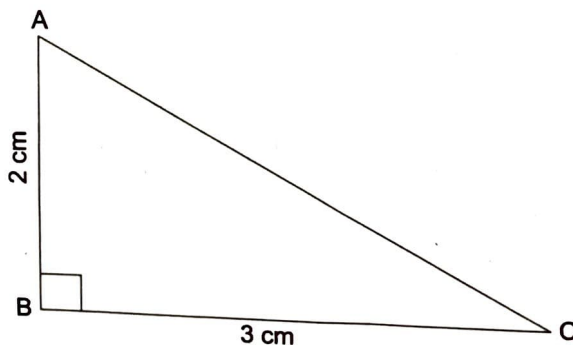
33. Two positive integers a and b can be written as $a = x^3y^2$ and $b = xy^3$, x, y are prime numbers. Find LCM (a, b). (CBSE 2018-19, 1 mark)
34. Find the HCF of 1260 and 7344 using Euclid's algorithm.
OR
Show that every positive odd integer is of the form $(4q + 1)$ or $(4q + 3)$, where q is some integer. (CBSE 2018-19, 2 mark)
35. Prove that $\sqrt{2}$ is an irrational number. (CBSE 2018-19, 3 marks)
36. The total number of factors of a prime number is (CBSE 2019-20, 1 mark)
(A) 1 (B) 0
(C) 2 (D) 3
37. The HCF and LCM of 12, 21, 15 respectively, are (CBSE 2019-20, 1 mark)
(A) 3,140 (B) 12,420
(C) 3,420 (D) 420,3
38. Prove that $\sqrt{5}$ is an irrational number (CBSE 2008-09, 3 marks)
39. Show that the square of any positive integer cannot be of form $(5q + 2)$ or $(5q + 3)$ for any integer q . (CBSE 2019-20, 4 marks)
40. Prove that one of every three consecutive positive integers is divisible by 3. (CBSE 2019-20, 4 marks)
41. The exponent of 5 in the prime factorization of 3750 is (CBSE 2021-22, TERM-I, 1 mark)
(A) 3 (B) 4
(C) 5 (D) 6
42. What is the greatest possible speed at which a girl can walk 95 m and 171 m in an exact number of minutes? (CBSE 2021-22, TERM-I, 1 mark)
(A) 17 m/min (B) 19 m/min
(C) 23 m/min (D) 13 m/min
43. Three alarm clocks ring their alarms at regular intervals of 20 min, 25 min and 30 min respectively. If they first beep together at 12 noon, at what time will they beep again for the first time? (CBSE 2021-22, TERM-I, 1 mark)
(A) 4 : 00 pm (B) 4 : 30 pm
(C) 5 : 00 pm (D) 5 : 30 pm
44. The greatest number which when divides 1251, 9377 and 15628 leaves remainder 1, 2 and 3 respectively is (CBSE 2021-22, TERM-I, 1 mark)
(A) 575 (B) 450
(C) 750 (D) 625
45. If a and b are two co prime numbers, then a^3 and b^3 are (CBSE 2021-22, TERM-I, 1 mark)
(A) Co prime (B) Not co prime
(C) Even (D) Odd

46. If n is a natural number, then $2(5^n + 6^n)$ always ends with (CBSE 2021-22, TERM-I, 1 mark)
 (A) 1 (B) 4
 (C) 3 (D) 2
47. The LCM of two numbers is 2400. Which of the following CANNOT be their HCF? (CBSE 2021-22, TERM-I, 1 mark)
 (A) 300 (B) 400
 (C) 500 (D) 600
48. If $p^2 = \frac{32}{50}$, then p is a/an: (CBSE 2022-23, 1 mark)
 (A) whole number (B) integer
 (C) rational number (D) irrational number
49. The ratio of HCF to LCM of the least composite number and the least prime number is: (CBSE 2022-23, 1 mark)
 (A) 1 : 2 (B) 2 : 1
 (C) 1 : 1 (D) 1 : 3
50. If the HCF of 360 and 64 is 8, then their LCM is: (CBSE 2022-23, 1 mark)
 (A) 2480 (B) 2780
 (C) 512 (d) 2880

DIRECTIONS (51): In the question number 4, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct option out of the following:

- (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 and 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.

51. **Assertion (A):** The perimeter of $\triangle ABC$ is a rational number.
Reason (R): The sum of the squares of two rational numbers is always rational. (CBSE 2022-23, 1 mark)



52. Show that $6n$ cannot end with digit 0 for any natural number ' n '.
 53. Find the HCF and LCM of 72 and 120. (CBSE 2022-23, 2 marks)
 54. Find the least number which when divided by 12, 16 and 24 leaves remainder 7 in each case. (CBSE 2022-23, 2 marks)

55. Two numbers are in the ratio 2: 3 and their LCM is 180. What is the HCF of these numbers?
 (CBSE 2022-23, 2 marks)
56. Find the HCF of the numbers 540 and 630, using prime factorization method.
 (CBSE 2022-23, 2 marks)
57. Show that $(15)^n$ cannot end with the digit 0 for any natural number 'n'.
 (CBSE 2022-23, 2 marks)
58. Find the HCF and LCM of 26, 65 and 117, using prime factorization.
 (CBSE 2022-23, 3 marks)
59. Prove that $\sqrt{2}$ is an irrational number.
 (CBSE 2022-23, 3 marks)
60. Prove that $\sqrt{5}$ is an irrational number.
 (CBSE 2022-23, 3 marks)
61. Prove that $10 + 2\sqrt{3}$ is an irrational number, given that $\sqrt{3}$ is an irrational number.
 (CBSE 2022-23, 3 marks)
62. If two positive integers p and q can be expressed as $p = 18a^2b^4$ and $q = 20a^3b^2$, where a and b are prime numbers, then LCM (p, q) is:
 (A) $2a^2b^2$ (B) $18a^2b^2$
 (C) $12a^2b^2$ (D) $180a^3b^4$
 (CBSE 2023-24, 1 Mark)
63. If the HCF (2520, 6600) = 40 and LCM (2520, 6600) = $252 \times k$, then the value of k is _____.
 (A) 1650 (B) 1600
 (C) 165 (D) 1625
 (CBSE 2023-24, 1 Mark)
64. If $a = 2^2 \times 3^x$, $b = 2^2 \times 3 \times 5$, $c = 2^2 \times 3 \times 7$ and LCM (a, b, c) = 3780, then x is equal to
 (A) 1 (B) 2
 (C) 3 (D) 0
 (CBSE 2023-24, 1 Mark)
65. Given HCF (2520, 6600) = 40, LCM (2520, 6600) = $252 \times k$, then the value of k is:
 (A) 1650 (B) 1600
 (C) 165 (D) 1625
 (CBSE 2023-24, 1 Mark)
66. A pair of irrational numbers whose product is a rational number is:
 (A) $(\sqrt{16}, \sqrt{4})$ (B) $(\sqrt{5}, \sqrt{2})$
 (C) $(\sqrt{3}, \sqrt{27})$ (D) $(\sqrt{36}, \sqrt{2})$
 (CBSE 2023-24, 1 Mark)
67. The HCF of two numbers 65 and 104 is 13. If LCM of 65 and 104 is $40x$, then the value of x is:
 (A) 5 (B) 13
 (C) 40 (D) 8
 (CBSE 2023-24, 1 Mark)
68. The greatest number which divides 281 and 1249, leaving remainder 5 and 7 respectively, is:
 (A) 23 (B) 276
 (C) 138 (D) 69
 (CBSE 2023-24, 1 Mark)

69. The LCM of three numbers 28, 44, 132 is: (CBSE 2023-24, 1 Mark)
 (A) 258 (B) 231
 (C) 462 (D) 924
70. If the product of two co-prime numbers is 553, then their HCF is: (CBSE 2023-24, 1 Mark)
 (A) 1 (B) 553
 (C) 7 (D) 79
71. (a) prove that $5 - 2\sqrt{3}$ is an irrational number. It is given that $\sqrt{3}$ is an irrational number. (CBSE 2023-24, 2 Marks)
OR
 (b) Show that the number $5 \times 11 \times 17 + 3 \times 11$ is a composite number.
72. Can the number $(15)^n$, n being a natural number, end with the digit 0? Give reasons. (CBSE 2023-24, 2 Marks)
73. Three bells toll at intervals of 9, 12, 15 minutes respectively. If they start tolling together, after what time will they next toll together? (CBSE 2023-24, 2 Marks)
74. In a teachers' workshop, the number of teachers teaching French, Hindi and English are 48, 80 and 144 respectively. Find the minimum number of rooms required if in each room the same numbers of teachers are seated and all of them are of the same subject. (CBSE 2023-24, 3 Marks)
75. (a) Prove that $\sqrt{3}$ is an irrational number. **OR**
 (b) Prove that $(\sqrt{2} + \sqrt{3})^2$ is an irrational number, given that $\sqrt{6}$ is an irrational number. (CBSE 2023-24, 3 Marks)
76. Prove that $\sqrt{5}$ is an irrational number. (CBSE 2023-24, 3 Marks)
77. Prove that $\frac{2 - \sqrt{3}}{5}$ is an irrational number, given that $\sqrt{3}$ is an irrational number.

Case Study

78. Teaching mathematics through activities is a powerful approach that enhances student's understanding and engagement. Keeping this in mind, Ms. Mukta planned a prime number game for class 5 students. She announces the number 2 in her class and asked the first student to multiply it by a prime number and then pass it to second student. Second student also multiplied it by a prime number and passed it to third student. In this way by multiplying to a prime number, the last student got 173250. (CBSE 2023-24, 3 Marks)

Now Mukta asked some questions as given below to the students:

- (i) What is the least prime number used by students?
 (ii) (a) How many students are in the class?

OR

- (b) What is the highest prime number used by students?
 (iii) Which prime number has been used maximum times?