STUDY MATERIALS

CLASS X

SUBJECT-MATHEMATICS

CH 1 – REAL NUMBERS

MCQs

1. HCF(52, 320) =
   a. 8 b. 4 c. 5 d. 1
2. For some integer q, every odd integer is of the form
   a. q b. q + 1 c. 2q d. 2q + 1
3. n^2 -1 is divisible by 8, if n is
   a. an integer b. a natural no. c. an odd integer d. an even integer
4. Which of the following have terminating decimal expansion?
   a. $\frac{11}{7000}$ $b. \frac{91}{21000}$ $c. \frac{343}{2^3 \times 5^3 \times 7^3}$ $d. none\ of\ these$
5. Let x = $\frac{7}{2^2 \times 5^3}$ be a rational no. Then x has a decimal expansion which terminates
   a. After 4 places of decimal
   b. After 3 places of decimal
   c. After 2 places of decimal
   d. After 5 places of decimal
6. The decimal expansion of $\frac{63}{72 \times 175}$ is
   a. Terminating b. non-terminating
   c. non-terminating and repeating d. none of these
7. The HCF of 5^{13} and 2^{26} is
   a. 0 b. 1 c. 13 d. 26
8. The least no. that is divisible by all the natural nos. from 1 to 10(both inclusive) is
   a. 10 b. 100 c. 504 d. 2520
9. If p is a prime no. and p divides k^2, then p does not divide
   a. $2k^2$ b. k c. 3k d. none of these
10. The no. $0.\overline{57}$ in the form p/q(q ≠ 0) is

a. $\frac{19}{35}$ b. $\frac{57}{99}$ c. $\frac{57}{95}$ d. $\frac{19}{30}$

11. If the HCF of 65 and 117 is expressible in the form 65m – 117, then the value of m is

a. 4 b. 2 c. 1 d. 3

12. If $a = x^3y^2$ and $b = xy^3$, where x, y are distinct prime nos. , then HCF (a, b) is equal to

a. x^3y^3 b. xy c. x^2y d. xy^2

13. Number of distinct primes in the prime factorization of 32760 is

a. 8 b. 5 c. 13 d. none of these

14. If 2 positive integers p and q can be expressed as $p = ab^2$ and $q = a^3b$, where a and b are distinct primes, then LCM(p, q) is

a. a^3b^2 b. ab c. ab^2 d. a^3b

15. If x and y are 2 odd primes such that x > y, then $x^2 – y^2$ is

a. An odd no. b. a prime no. c. an even no. d. an odd prime no.

16. The product of a non-zero rational and an irrational no. is always

a. Even b. odd c. rational d. irrational

17. If x is rational, y is irrational and xy is rational, then

a. $x < 0$ b. $x = 0$ c. $x > 0$ d. none of these

18. Euclid's division lemma states that for two positive integers a and b, there exist unique integers q and r such that a = bq + r, where r must satisfy

a. $1 < r < b$ b. $0 < r \leq b$ c. $0 \leq r < b$ d. $0 < r < b$

19. If HCF of two numbers is 1, the nos. are called relatively ______________ or ______________.

a. Prime, co-prime
b. Composite, prime
c. Both a and b
d. None of these

20. By Euclid's division lemma x = qy + r, x>y, then value of q and r for x = 58 and y = 7 are

a. q = 8, r = 2
b. q = 6, r = 2
c. q = 9, r = 5
d. q = 5, r = 2

FILL IN THE BLANKS:

1. If every positive integer is of the form 2q, then every positive odd integer is of the form _______________ , where q is some integer.
2. Every point on the number line corresponds to a _______________ number.
3. Every real no. is either a______________ number or an ________________ number.
4. The product of three numbers is ________________ to the product of their HCF and LCM.
5. If a = bq + r, least value of r is ________________.
6. Numbers having non-terminating, non-repeating decimal expansion are known as __________________.
7. If HCF(a, b) = 2 and LCM(a, b) = 27, the value of ab is______________.
8. A rational no. can be expressed as terminating decimal when the factors of the denominator are _________________.
9. The only prime which divides 4^n is _______________.
10. $7 \times 11 \times 13 + 13$ is a ________________ number.

VSA

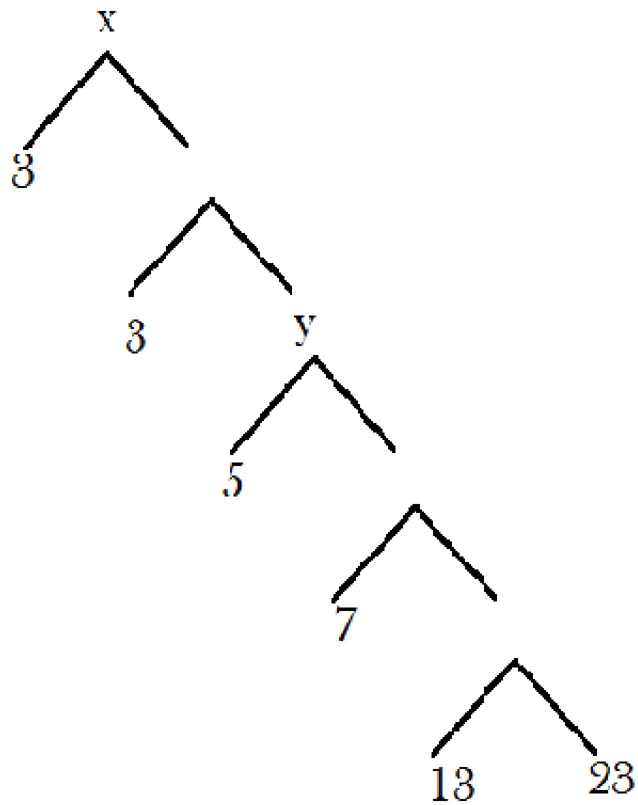
1. State Euclid's division lemma.
2. If HCF of two integers a and b is 12 and the product $a \times b = 1800$, then find the LCM of a and b .
3. If m and n are positive integers such that $m^n = 32$, then find the value of n^{mn}.
4. Write the decimal expansion of $\frac{1}{15}$.
5. Is 4 a factor of $x^2 + y^2$, where both x and y are odd positive integers? Justify your answer.
6. What is the greatest prime in the prime factorization of 1771?
7. Write the number of zeroes in the end of a number whose prime factorization is $2^2 \times 5^3 \times 3^2 \times 17$.
8. The LCM of two numbers is 9 times their HCF. The sum of LCM and HCF is 500. Find the HCF of the two numbers.
9. State fundamental theorem of arithmetic.
10. What is the HCF of $3^3 \times 5$ and $3^2 \times 5^2$?

11. A number N when divided by 14 gives the remainder 5. What is the remainder when the same number is divided by 7?
12. What are the possible values of the remainder r, when a positive integer a is divided by 3?
13. A rational number in its decimal expansion is 1.7351. What can you say about the prime factors of q when this number is expressed in the form of p/q? Give reason.
14. Can two numbers have 12 as HCF and 350 as LCM? Justify your answer.
15. Can 15^n end with the digit 0, for any natural number n? Justify your answer.
16. A rational number in its decimal expansion is $12.\overline{32701}$. What can you state about the prime factors of q when this number is expressed in the form of p/q? Give reasons.
17. Is $13 \times 19 \times 29 + 29$ prime or composite? Justify.

SA (SHORT ANSWER)
TYPE 1

1. Find the HCF of 612 and 1314 using prime factorization.
2. Find the HCF of 1260 and 7344 using Euclid's algorithm.
3. After how many decimal places the decimal representation of $\frac{2187}{1250}$ will terminate and write the decimal without performing the long division?
4. Write the following rational numbers in the form of p/q where p and q are co-primes and $q \neq 0$.
   a. $0.1\overline{6}$ b. 0.2343434.......
5. Show that $\frac{3+\sqrt{7}}{5}$ is an irrational number, given that $\sqrt{7}$ is irrational.
6. If two positive integers p and q are written as $p = a^2b^3$ and $q = a^3b$ where a and b are prime numbers, then verify $LCM(p, q) \times HCF(p, q) = pq$.
7. Find the LCM of $x^2 - 4$ and $x^4 - 16$.
8. Both the numbers 525 and 3000 are divisible only by 1, 3, 5, 15, 25 and 75. What is the HCF(525, 3000)? Justify your answer.

9. In the adjoining factor tree , find the numbers x and y.



10. Given that HCF(2520, 6800) = 252 × k. Find the value of k.

11. Prove that $2\sqrt{3} - 5$ is irrational.

12. If HCF of 144 and 180 is expressed in the form of 13m – 3 , find the value of m.

13. By using Euclid's algorithm , find the largest number which divides 650 and 1170.

14. Write the denominator of the rational number $\frac{257}{5000}$ in the form 2^m x 5^n, where m and n are non-negative integers. Hence write its decimal expansion without actual division.

15. Express the number $0.3\overline{178}$ in the form of rational number $\frac{a}{b}$.

SA (SHORT ANSWER)
TYPE 2

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

2. Using prime factorization method, find the HCF and LCM of 30, 72 and 432. Also show that HCF x LCM $\neq$ product of three numbers.
3. Show that the reciprocal of $3\sqrt{5}$ - 2 is an irrational number.
4. If n is an odd positive integer, show that $(n^2 – 1)$ is divisible by 8.
5. Three bells toll at intervals of 12 min, 15min and 18min respectively. If they start tolling together, after what time will they toll together?
6. Show that $(\sqrt{2} + \sqrt{3})^2$ is an irrational number.
7. Find the largest number that will divide 400, 437 and 542 leaving remainder 9, 12 and 15 respectively.
8. A circular field has a circumference of 360km. Three cyclists start together and can cycle 48, 60 and 72 km a day , round the field. When will they meet again?
9. Express the HCF of 468 and 222 as 468x + 222y where x, y are integers.
10. What is the smallest number that, when divided by 35, 56 and 91 leaves remainders of 7 in each case?

LONG ANSWER TYPE

1. Use Euclid's division lemma to show that the cube of any positive integer is either of the form 9m, 9m+1 or 9m+8 for some integer m.
2. Show that one and only one out of n, n+2, n+4 is divisible by 3.
3. Show that the square of any positive integer cannot be of the form 5q+2 or 5q+3 for any integer q.
4. If p, q are prime positive integers, prove that $\sqrt{p} + \sqrt{q}$ is an irrational number.
5. Show that there is no positive integer n for which $\sqrt{n-1} + \sqrt{n+1}$ is rational.

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