NCERT Solutions Class 10 Maths
Chapter 1: Real Numbers
EXERCISE 1.1

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Quick Summary: In NCERT Solutions Class 10 Maths Chapter 1 Exercise 1.1, students learn Euclid's Division Algorithm and its applications in finding HCF and LCM through prime factorization. This exercise covers fundamental concepts of real numbers including the division algorithm formula $a = bq + r$ where $0 \leq r < b$, which are essential for CBSE board exams and form the foundation for advanced number theory concepts.

Key Takeaways:

- Euclid's Division Algorithm: For any positive integers a and b, there exist unique integers q and r such that $a = bq + r$ where $0 \leq r < b$
- Prime factorization method to find HCF and LCM by expressing numbers as products of prime factors
- Application of Fundamental Theorem of Arithmetic to solve problems involving divisibility and terminating decimals
- Step-by-step solutions for checking whether numbers like 6^n can end with specific digits using prime factorization

Complete Solutions

Question 1

QUESTION

Express each number as a product of its prime factors:

(i) 140,

(ii) 156,

(iii) 3825,

(iv) 5005,

(v) 7429

SOLUTION

We need to express each number as a product of prime numbers only. We will divide the given number, step by step, by the smallest prime factor each time and continue until all the remaining numbers are prime.

(i) 140

First, look at 140. It is even, so it is divisible by , which is a prime number.

Divide 140 by : .

Now we have 70. This is also even, so again it is divisible by .

Divide 70 by : .

Now we have 35. It is not even, so it is not divisible by . Next check if it is divisible by the prime . A number is divisible by 3 if the sum of its digits is divisble by 3. The sum of digits of 35 is , which is not divisible by , so 35 is not divisible by .

Try the next prime, . The last digit of 35 is 5, so it is divisible by .

Divide 35 by : .

Now we get 7. The number 7 is a prime number.

So the prime factors of 140 are . Writing them as a product, we get .

In index form, , so we write: .

(ii) 156

Look at 156. It is even, so it is divisible by .

Divide 156 by : .

Now we have 78. This is also even, so again it is divisible by .

Divide 78 by : .

Now we have 39. It is not even, so not divisible by . Check divisibility by . The sum of digits of 39 is , and 12 is divisible by , so 39 is divisible by .

Divide 39 by : .

Now we get 13. The number 13 is a prime number.

So the prime factors of 156 are . As a product, is .

We can write , so we get .

(iii) 3825

Start with the smallest prime, . Since 3825 is odd, it is not divisible by . So we will not check again for any of the later numbers.

Next prime is . The sum of digits is , and 18 is divisible by . So 3825 is divisible by .

Divide 3825 by : .

Now we continue checking with the same prime, . The sum of digits of 1275 is , which is divisible by . So 1275 is divisible by .

Divide 1275 by : .

Now check 425 for . The sum of digits is , which is not divisible by . So we will not check again for any later numbers.

The next prime is . The last digit of 425 is 5, so 425 is divisible by .

Divide 425 by : .

Continue checking with . The last digit of 85 is 5, so 85 is divisible by .

Divide 85 by : .

Now check 17 for . The last digit is 7, so it is not divisible by . So we will not check again for further numbers.

The next prime is . 17 is not divisible by , and since , 17 must be prime.

Thus, the prime factors of 3825 are .

As a product, we write this as .

Grouping equal primes: .

(iv) 5005

Take 5005. The last digit is 5, so it is divisible by .

Divide 5005 by : .

Now consider 1001. It is not even, and the sum of its digits is , so it is not divisible by or . Check for next: it does not end in 0 or 5, so it is not divisible by .

Try the next prime, . We test and find that , so 1001 is divisible by 7.

Now we have 143. It is not even, and the sum of digits is , so it is not divisible by or . It does not end in 0 or 5, so not divisible by .

Try the next prime, , but is not a whole number.

Try . We find that .

Now we get 13, which is prime.

So the prime factors of 5005 are .

We write this as a product: .

(v) 7429

Now take 7429. It is not even, so it is not divisible by . Check the sum of digits: . Since 22 is not divisible by , 7429 is not divisible by .

The last digit is 9, so it is not divisible by .

Try dividing by the prime . The value is not a whole number, so 7 is not a factor.

Try the next prime, . The division is also not a whole number.

Try . Again, does not give a whole number.

Next, try the prime . We get , which is a whole number, so 17 is a factor.

Now consider 437. It is not even, and the sum of its digits is , so it is not divisible by . It does not end in 0 or 5, so not divisible by .

Try dividing 437 by ; it does not give a whole number.

Try the next prime, . We get , which is a whole number.

Now we have 23, which is a prime number.

So the prime factors of 7429 are .

Writing them as a product, we get .

ANSWER

(i) $2^2 \times 5 \times 7$

(ii) $2^2 \times 3 \times 13$

(iii) $3^2 \times 5^2 \times 17$

(iv) $5 \times 7 \times 11 \times 13$

(v) $17 \times 19 \times 23$

Question 2

QUESTION

Find the LCM and HCF of the following pairs of integers and verify that LCM × HCF = product of the two numbers:

(i) 26 and 91,

(ii) 510 and 92,

(iii) 336 and 54.

SOLUTION

To find the HCF and LCM using prime factorisation, we first write each number as a product of prime numbers. We test divisibility by primes in the correct order (2, 3, 5, 7, …), and once a number is not divisible by a smaller prime, we do not check that prime again for the same number.

HCF (Highest Common Factor) is the product of all common prime factors with the smallest power.

LCM (Least Common Multiple) is the product of all prime factors that appear in any of the numbers, using the highest power.

After that, we verify:

(i) 26 and 91

Prime factorisation of 26:

26 is even, so it is divisible by 2.

13 is prime.

Prime factorisation of 91:

91 is not divisible by 2.

Sum of digits = 10, not divisible by 3, so 91 is not divisible by 3.

Last digit is not 0 or 5, so not divisible by 5.

Check next prime 7: .

So, .

So we have:

HCF

Common prime = 13.

So, .

LCM

All primes used: 2, 7, 13

Verification

Hence verified.

(ii) 510 and 92

Prime factorisation of 510:

510 is even ⇒ divide by 2.

255 ends in 5 ⇒ divisible by 5.

51 digit sum = 6 ⇒ divisible by 3.

So,

Prime factorisation of 92:

92 is even ⇒ divisible by 2.

46 is even again.

23 is prime.

So,

So we have:

HCF

Common prime = 2.

Lowest power = .

So, HCF = 2.

LCM

All primes: 2, 3, 5, 17, 23

Verification

Hence verified.

(iii) 336 and 54

Prime factorisation of 336:

336 is even:

21 is not even ⇒ check 3.

Digit sum = 3 ⇒ divisible by 3.

So,

Prime factorisation of 54:

54 is even:

27 is not divisible by 2.

Digit sum = 9 ⇒ divisible by 3.

So,

So we have:

HCF

Common primes = 2, 3

For 2: smallest power = 1

For 3: smallest power = 1

LCM

Highest powers:

2 →

3 →

7 →

Verification

Hence verified.

ANSWER

(i) LCM = 182; HCF = 13

(ii) LCM = 23460; HCF = 2

(iii) LCM = 3024; HCF = 6

Question 3

QUESTION

Find the LCM and HCF of the following integers by applying the prime factorisation method: (i) 12, 15 and 21, (ii) 17, 23 and 29, (iii) 8, 9 and 25.

SOLUTION

We will use the prime factorisation method. First, we write each number as a product of prime numbers.

HCF (Highest Common Factor) is the product of all prime factors that are common to *all* the given numbers, taken with their smallest powers.

LCM (Least Common Multiple) is the product of all prime factors that appear in *any* of the numbers, taken with their highest powers.

We now apply this to each group of numbers.

(i) 12, 15 and 21

First, write prime factorisation of each number.

For 12:

For 15:

For 21:

Finding HCF

Look for prime factors that are common to all three numbers.

The prime factors are:

12 has

15 has

21 has

The only prime factor common to all three is .

So,

Finding LCM

Now take all distinct prime factors appearing in any of the numbers.

These are .

The highest powers among the three numbers are:

from 12

from each (all have at most one 3)

from 15

from 21

So,

Now multiply step by step.

So,

Final answers for (i)

(ii) 17, 23 and 29

All three numbers 17, 23 and 29 are prime numbers.

So their prime factorisations are:

Finding HCF

For the HCF, we look for prime factors that are common to all three numbers.

Since each number is a different prime, they have no common prime factor greater than 1.

So,

Finding LCM

For the LCM of distinct primes, we simply multiply them together.

So,

First multiply 17 and 23.

Now multiply this result by 29.

So,

Final answers for (ii)

(iii) 8, 9 and 25

Now factor each number into primes.

For 8:

Divide by 2 again and again.

For 9:

For 25:

Finding HCF

We look for prime factors that are common to all three numbers.

8 has only prime factor .

9 has only prime factor .

25 has only prime factor .

There is no prime factor that is common to all three.

So,

Finding LCM

Now take all prime factors that appear in any of the numbers.

These are .

The highest powers are:

from 8

from 9

from 25

So,

Calculate step by step.

Now multiply these results.

So,

Final answers for (iii)

ANSWER

(i) LCM = 420; HCF = 3

(ii) LCM = 11339; HCF = 1

(iii) LCM = 1800; HCF = 1

Question 4

QUESTION

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

SOLUTION

We are given two numbers, 306 and 657, and their HCF (Highest Common Factor) is 9.

There is a standard relation between LCM and HCF of two numbers:

We can use this relation to find the LCM when the HCF and the two numbers are known.

Step 1: Write the relation for our numbers

Here, the numbers are 306 and 657, and

So,

We want to find .

Step 2: Rearrange the formula to make LCM the subject

From

we get

Step 3: Simplify the fraction

It is easier to first divide 306 by 9, instead of multiplying first and then dividing.

Compute:

So the expression becomes:

Step 4: Multiply 34 and 657

We multiply step by step using simple break-up.

Write 34 as .

First, calculate .

So,

Next, calculate .

Now add these two results:

So,

Step 5: Conclude the value of LCM

We have found:

Therefore, the LCM of 306 and 657 is 22338.

ANSWER

22338

Question 5

QUESTION

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

SOLUTION

We are asked to check whether the number can ever end with the digit 0, where is any natural number.

Step 1: Understand what it means for a number to end with 0

If a number ends with 0, it must be divisible by 10.

Being divisible by 10 means the number must contain both prime factors:

and

This is because:

So, for to end in 0, the number must include the factor 5.

Step 2: Look at the structure of

We know:

So,

Using exponents, this becomes:

Step 3: Check whether any power of 6 contains the factor 5

The prime factors in are only and .

There is *no* factor of in for any natural number .

Since a factor 5 never appears, can never be divisible by 10.

Step 4: Observe the last digit pattern of powers of 6

Let us check the first few powers:

In each case, the last digit is 6.

This pattern continues for every higher power because multiplying a number ending in 6 by 6 again always gives a number ending in 6.

Step 5: Conclude the result

Since no power of 6 contains the factor 5, can never be divisible by 10 and therefore cannot end with 0.

Thus:

never ends with 0 for any natural number .

ANSWER

6^n cannot end with 0 because it always ends with 6 for all natural numbers n.

Question 6

QUESTION

Explain why 7 × 11 × 13 + 13 and 7 × 6 × 5 × 4 × 3 × 2 × 1 + 5 are composite numbers.

SOLUTION

We have to show that each given number is **composite**. A composite number is a natural number greater than 1 which has *at least one factor* other than 1 and itself. So our aim is to factorise each expression.

1) Number:

Start with the expression:

We can see that both terms contain the number . So, we factor out as a common factor.

First term:

Second term:

Take common:

Now simplify inside the bracket:

So we get:

Here, both and are greater than 1.

So the number has factors and , apart from 1 and itself.

Therefore, is a **composite number**.

2) Number:

First observe the product part:

This is the same as (factorial 7), but we will work it out step by step.

Multiply step by step:

So the product is:

Now add 5:

So the number is .

Now show that 5045 is composite.

Notice that 5045 ends in the digit 5. Any number ending in 5 is divisible by .

So 5 is a factor of 5045.

Let us divide 5045 by 5:

Therefore, we can write:

Here, both and are greater than 1.

So, 5045 has at least two factors other than 1 and itself, namely and .

Hence, is a **composite number**.

Conclusion

We have factorised each expression as a product of two numbers greater than 1:

Therefore, both given numbers are composite.

ANSWER

7 × 11 × 13 + 13 = 13(7 × 11 + 1) is composite. 7 × 6 × 5 × 4 × 3 × 2 × 1 + 5 = 5040 + 5 = 5045 = 5 × 1009 is also composite.

Question 7

QUESTION

There is a circular path around a sports field. Sonia takes 18 minutes to drive one round of the field, while Ravi takes 12 minutes for the same. Suppose they both start at the same point and at the same time. When will they meet again at the starting point?

SOLUTION

We are told that Sonia and Ravi both start from the same point on a circular path at the same time. Sonia takes minutes for one round, and Ravi takes minutes for one round.

We want to find after how many minutes they will both be **together again at the starting point**.

This type of question is solved using the **LCM** (Least Common Multiple) of their times.

Idea: Each time Sonia completes a round, a multiple of minutes has passed. Each time Ravi completes a round, a multiple of minutes has passed. They will both be at the starting point together when the time passed is a **common multiple** of and .

The **earliest** such time is the **LCM** of and .

Step 1: Write prime factorisation

Factorise into primes.

So,

Now factorise into primes.

So,

Step 2: Find the LCM using highest powers

List all distinct prime factors: and .

For :

Highest power is (from 12).

For :

Highest power is (from 18).

So,

Now calculate step by step.

Multiply these:

So,

Step 3: Interpret the result

The LCM tells us that after minutes:

– Sonia will have completed a whole number of rounds.

– Ravi will have completed a whole number of rounds.

So both will be back **together** at the starting point.

Final answer: They will meet again at the starting point after minutes.

ANSWER

36 minutes

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📐 Key Formulas

Important Formulas for Exercise 1.1

Formula / Concept	Description
Euclid's Division Lemma	For any two positive integers, say 'a' and 'b', there exist unique whole numbers 'q' (quotient) and 'r' (remainder) such that a = bq + r, where 0 \le r < b. This is also commonly remembered as Dividend = (Divisor × Quotient) + Remainder.
	It is a step-by-step procedure based on Euclid's Division Lemma that is used to find the Highest Common Factor (HCF) of two positive integers. The algorithm involves

Formula / Concept	Description
Euclid's Division Algorithm	repeatedly applying the division lemma until the remainder becomes zero. The last non-zero divisor at that stage is the HCF of the two numbers.
Fundamental Theorem of Arithmetic	Every composite number can be expressed (factorized) as a product of primes, and this factorization is unique, apart from the order in which the prime factors occur. For example, the number 30 can be written as 2 × 3 × 5.
Relationship between HCF and LCM	For any two positive integers 'a' and 'b', the product of their HCF and LCM is equal to the product of the two numbers. Mathematically, it is expressed as: HCF(a, b) × LCM(a, b) = a × b

? Top FAQs

Q1. How many questions are in NCERT Solutions for Class 10 Maths Chapter 1 Real Numbers Exercise 1.1 for CBSE 2025-26?

Exercise 1.1 of NCERT Solutions for Class 10 Maths Chapter 1 Real Numbers contains exactly 7 questions. All these questions are based on Euclid's Division Algorithm and require step by step solutions for better understanding. These problems carry significant weightage in CBSE board exam 2025-26.

Q2. Where can I download free PDF of NCERT Solutions for Class 10 Maths Chapter 1 Real Numbers Exercise 1.1 with step by step solutions?

You can download the free PDF of NCERT Solutions for Class 10 Maths Chapter 1 Real Numbers Exercise 1.1 from the official NCERT website or various educational portals. The PDF includes detailed step by step solutions for all 7 questions based on Euclid's Division Algorithm. These solutions are updated as per the CBSE syllabus 2025-26.

Q3. How many marks does Real Numbers Chapter 1 carry in CBSE Class 10 Maths board exam 2025-26?

The Real Numbers chapter (Chapter 1) carries 5 marks in CBSE Class 10 Maths board exam 2025-26 under Unit I - Number Systems. Exercise 1.1 focuses on Euclid's Division Algorithm which is crucial for solving board exam questions. Students should practice all NCERT Solutions thoroughly to score full marks.

Q4. Which is the most difficult question in NCERT Solutions Exercise 1.1 of Class 10 Maths Chapter 1 Real Numbers?

Question 5 and Question 7 in Exercise 1.1 of Class 10 Maths Chapter 1 Real Numbers are considered the most challenging as they require deep understanding of Euclid's Division Algorithm applications. These questions need step by step solutions and conceptual clarity for CBSE board exam 2025-26. Practice with detailed NCERT Solutions helps master these problems.

Q5. What is Euclid's Division Algorithm explained in NCERT Solutions Class 10 Maths Chapter 1 Real Numbers Exercise 1.1?

Euclid's Division Algorithm states that for any two positive integers 'a' and 'b', there exist unique integers 'q' and 'r' such that $a = bq + r$, where $0 \leq r < b$. Exercise 1.1 of NCERT Solutions for Class 10 Maths Chapter 1 Real Numbers contains 7 questions based on this fundamental concept. This algorithm is essential for finding HCF and solving problems in CBSE board exam 2025-26.

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