4

Multiples and Factors

We'll cover the following key points:

- → Multiples
- → Properties of Multiples
- → Factors
- → Divisibility Rules
- → Prime and Composite Numbers
- → Even and Odd Numbers
- → Prime Factorisation
- → Highest Common Factor (HCF)
- → Lowest Common Multiple (LCM)
- → Problems on HCF and LCM

EeeBee

Do you Remember fundamental concept in previous class.
In class 4th we learnt

- → Multiples
- → Factors
- → Prime and Composite Numbers
- → Highest Common Factor (HCF)
- → Lowest Common Multiple (LCM)
- → Prime Factorisation
- → Problems on HCF and LCM

Still curious? Talk to me by scanning the QR code.

Learning Outcomes

By the end of this chapter, students will be able to:

- Understand the concepts of multiples and factors of a number.
- Differentiate between multiples and factors.
- Identify factors and multiples of a given number.
- Determine whether a given number is a multiple or factor of another number.
- Recognize and list prime and composite numbers.
- Understand and apply divisibility rules for 2, 3, 5, 9, and 10.
- Find the Highest Common Factor (HCF) and Least Common Multiple (LCM) of two or more numbers.
- Solve real-life problems using multiples and factors, including word problems.
- Apply knowledge of multiples and factors to simplify fractions and solve problems related to them.

Warm Up

Experiential Learning

Choose the best answer.

1. What is a factor?

(a) A number multiplied by another number to find a product. ☐

(b) The product of a given whole number and another whole number. ☐

(c) The greatest factor that two or more numbers have in common. ☐

(d) The smallest numbers that is a multiple of two or more numbers. ☐

2. What is a multiple?

(a) A number multiplied by another number to find a product. ☐

(b) The product of a given whole number and another whole number. ☐

(c) The greatest factor that two or more numbers have in common. ☐

(d) The smallest numbers that is a multiple of two or more numbers. ☐

3. What are the factors of 12?

(a) 1, 2, 6, 12 ☐ (b) 1, 2, 3, 6, 12 ☐

(c) 12, 24, 36, 48, 60 ☐ (d) 1, 2, 3, 4, 6, 12 ☐

4. What are the multiples of 8?

(a) 1, 2, 4, 8 ☐ (b) 8, 16, 24, 36, 45 ☐

(c) 8, 16, 24, 36, 40 ☐ (d) 8, 16, 24, 32, 40 ☐

5. Which of the following is a prime number?

(a) 3 ☐ (b) 6 ☐

(c) 9 ☐ (d) 12 ☐

6. Which of the following is a composite number?

(a) 1 ☐ (b) 3 ☐

(c) 9 ☐ (d) 11 ☐

Take a Task

Watch Remedial

Multiples

Let us revise the multiplication table of 5.

5 multiplied by 1 = 5	→	5 × 1 = 5	5 multiplied by 6 = 30	→	5 × 6 = 30
5 multiplied by 2 = 10	→	5 × 2 = 10	5 multiplied by 7 = 35	→	5 × 7 = 35
5 multiplied by 3 = 15	→	5 × 3 = 15	5 multiplied by 8 = 40	→	5 × 8 = 40
5 multiplied by 4 = 20	→	5 × 4 = 20	5 multiplied by 9 = 45	→	5 × 9 = 45
5 multiplied by 5 = 25	→	5 × 5 = 25	5 multiplied by 10 = 50	→	5 × 10 = 50

The numbers 5, 10, 15, 20,....... are obtained on multiplying 5 by 1,2,3,5,4,..... respectively.

The numbers 5,10,15,20,....... are called the **multiples** of 5.

Similarly, Multiples of 8 : 8, 16, 24, 32, 40, ...

Multiples of 10 : 10, 20, 30, 40, 50, ...

Multiples of 15 : 15, 30, 45, 60, 75, ...

If we multiply a number by 1, 2, 3, 4, ..., we get the multiple of that number.

Properties of Multiples

- Every number is a multiple of 1 and a multiple of itself.
- The smallest (first) multiple of a number is the number itself.
- Every multiple of a number is equal to or greater than the number.
- The multiples of a number are endless. Thus, there is no greatest multiple of a number.
- The multiples of 2 are called **even numbers** and the numbers which are not multiples of 2 are called **odd numbers**.

REMEMBER

The multiples of even numbers are always even. The multiples of odd numbers can be either odd or even.

Finding multiples

To find the multiples of a number, multiply it by 1, 2, 3, 4 and so on.

Example 1 : Find the first five multiples of 5.

Solution: $5 \times 1 = 5$, $5 \times 2 = 10$,

$5 \times 3 = 15$, $5 \times 4 = 20$,

$5 \times 5 = 25$

Thus, first five multiples of 5 are 5, 10, 15, 20 and 25.

Example 2 : Find the first six even multiples of 4

Solution: $4 \times 2 = 8$, $4 \times 4 = 16$,

$4 \times 6 = 24$, $4 \times 8 = 32$,

$4 \times 10 = 40$

Thus, first six even multiples of 4 are 8, 16, 24, 32, 40 and 48.

Example 3 : Find the first four odd multiples of 7.

$7 \times 1 = 7$, $7 \times 3 = 21$, $7 \times 5 = 35$, $7 \times 7 = 49$

Thus, first four odd multiples of 7 are 7, 21, 35 and 49.

Factors

$6 \times 8 = 48$

48 is a multiple of 6 and 8 ← → 6 and 8 are the factors of 48

$2 \times 5 \times 7 = 70$

70 is a multiple of 2,5 and 7 ← → 2,5 and 7 are the factors of 70

Similarly, 8,9 are the factors of 72, because $8 \times 9 = 72$

2, 3, 5 are the factors of 30, because $2 \times 3 \times 5 = 30$.

When we multiply any two or more numbers, we get a product. The product is a multiple of each of the numbers multiplied and each number is a factor of the product.

Properties of Factors

- 1 is a factor of all numbers.
- 1 is the smallest factor of a number.
- A number is a factor of itself.
- A number itself is the greatest factor of itself.
- The factor of a number is smaller than or equal to the number.
- Every number has at least two factors, that is, 1 and itself.

  The number 1 is an exception.

Finding factors

Example 4 : Is 5 a factor of 75?

```
   1 5
5) 7 5
 - 5
   2 5
 - 2 5
     0
```

Thus, yes, 5 is a factor of 75

Example 5 : Write all the factors of 12.

Factors of 12

1×12

2×6

3×4

Thus, the factors of 12 are

1, 2, 3, 4, 6 and 12.

Mental Math

Critical Thinking

Fill in the blanks:

1. ______________ is a factor of all numbers.
2. The smallest factor of 14 is ___________ .
3. 6 is a factor of 18 as 18 can be divided by ___________ exactly.
4. All numbers except 1 have at least __________ factors.

Divisibility Rules

Divisibility rules help you to find if a number is completely divisible by another number, without actually dividing.

For example.

```
    8
9) 7 2
 - 7 2
     0
```

72 is divisible by 9

since remainder is 0.

```
     5
6) 3 5
 - 3 0
     5
```

35 is not divisible by 6

since remainder is not 0.

Test of Divisibility by	Condition	Example
2	A number is divisible by 2, if its last digit is even or 0.	1442, 1980, 1560, 396 etc. are divisible by 2.
3	A number is divisible by 3, if the sum of its digits is divisible by 3.	In 3540 : 3 + 5 + 4 + 0 = 12 which is divisible by 3. 8262: also divisible by 3.

4.	A number is divisible by 4 if the number formed by its last two digits is multiple of 4; (or divisible by 4)	79812, 864, 5068, 1234596 etc.
5	A number is divisible by 5, if the digit at its unit place is either 5 or 0.	3450, 12345, 567890, 99995 etc.
6	A number is divisible by 6, if the number is divisible by 2 and 3.	750, 7710, 5922, 60606, 11514 etc.
7	A number is divisible by 7 if the difference between twice the last digit and the number formed by other digits is either 0 or a multiple of 7.	2975, 1617, 392, 889 Consider 889, Last digit = 9 Now 88 - 18 =70 Hence 889 is divisible by 7.
8	A number is divisible by 8 if the number formed by its last three digits is divisible by 8.	989232 (the number 232 is divisible by 8). 1839608, 1804264, 1516024 etc.
9	A number is divisible by 9, if the sum of its digits is divisible by 9.	9801, 50436, 123453, 91917, etc.
10	A number is divisible by 10, if the last digit (i.e. the digit at unit's place) is 0.	990, 15340, 63990, 101020 etc.
11	A number is divisible by 11, if the difference between the sums of its alternate digits is 0 or a multiple of 11.	7931: $7+3=10$ $9+1=10$ Since, $10-10=0$ $\therefore$ 7931 is divisible by 11. 27896, 135795, 1086294, 1111110 etc.

Exercise 4.1

Knowledge Application

1. Write the next four multiples:

(a) 9, 18, 27, 36, ________, ________, ________, ________

(b) 12, 24, 36, 48, ________, ________, ________, ________

(c) 23, 46, 69, 92, ________, ________, ________, ________

(d) 19, 38, 57, 76, ________, ________, ________, ________

2. Write the first five multiples of the following numbers:

(a) 27 (b) 17 (c) 16 (d) 39 (e) 43

3. List all the factors of each of the following :

(a) 18 (b) 28 (c) 21 (d) 36

4. Put a tick (✓) if the number is divisible and a cross (✗) if it is not divisible.

Number	Divisible by							
	2	3	4	6	7	8	9	10	11
(a) 12	✓	✓	✓	✓	✗	✗	✗	✗	✗
(b) 93584									
(c)25712									
(d) 24934									
(e) 32868									

5. Write the missing factor.

(a) $7 \times$ ______ $= 63$ (b) $12 \times$ ______ $= 36$ (c) ______ $\times 15 = 45$

(d) ______ $\times 6 = 54$ (e) ______ $\times 8 = 80$ (f) $9 \times 3 =$ ______

Prime and Composite Numbers

Aman has written all the factors of the numbers from 1 to 15 in the table on the left.

Help him colour the boxes to show the factors in the number grid on the right.

NUMBER	FACTORS
1	1
2	1, 2
3	1, 3
4	1, 2, 4
5	1, 5
6	1, 2, 3, 6
7	1, 7
8	1, 2, 4, 8
9	1, 3, 9
10	1, 2, 5, 10
11	1, 11
12	1, 2, 3, 4, 6, 12
13	1, 13
14	1, 2, 7, 14
15	1, 3, 5, 15

FACTORS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															

Number with only two factors, that is, 1 and the number itself are called **prime numbers**. Numbers with three or more factors are called **composite numbers**.

We observe that

- The number 1 has only one factor, that is, 1.
- 2 has two factors, that is, 1 and 2.
- 6 has four factors, that is, 1,2, 3 and 6.

Mental Math

Critical Thinking

1. Write the numbers that have only 2 factors (1 and the number itself). ____________
2. Write the numbers that have 3 or more factors. ____________

REMEMBER

The number 1 is unique. It has only one factor, that is, 1. So, 1 is neither prime nor composite.

Prime numbers between 1 and 100

About 230 BC, a Greek Mathematician, **Eratosthenes**, developed a method of finding prime numbers. This method is called the **Sieve of Eratosthenes**.

Look at this number grid.

- Cross out 1.
- Leave 2 as it is prime. Cross out all the other even numbers.
- Leave 3 as it is prime. Cross out all the other multiples of 3.
- Leave 5. Cross out all the other multiples of 5.
- Leave 7. Cross out all the other multiples of 7.
- Circle all the numbers which are left.
- Find out how many left numbers are not crossed out.

~~1~~	2	3	~~4~~	5	~~6~~	7	~~8~~	~~9~~	~~10~~
11	~~12~~	13	~~14~~	15	~~16~~	17	~~18~~	19	~~20~~
~~21~~	~~22~~	23	~~24~~	~~25~~	~~26~~	~~27~~	~~28~~	29	~~30~~
31	~~32~~	~~33~~	~~34~~	~~35~~	~~36~~	37	~~38~~	~~39~~	~~40~~
41	~~42~~	43	~~44~~	~~45~~	~~46~~	47	~~48~~	~~49~~	~~50~~
~~51~~	~~52~~	53	~~54~~	~~55~~	~~56~~	~~57~~	~~58~~	59	~~60~~
61	~~62~~	~~63~~	~~64~~	~~65~~	~~66~~	67	~~68~~	~~69~~	~~70~~
71	~~72~~	73	~~74~~	~~75~~	~~76~~	~~77~~	~~78~~	79	~~80~~
~~81~~	~~82~~	83	~~84~~	~~85~~	~~86~~	~~87~~	~~88~~	89	~~90~~
~~91~~	~~92~~	~~93~~	~~94~~	~~95~~	~~96~~	97	~~98~~	~~99~~	~~100~~

In all, odd numbers are not crossed out. These are **prime numbers**.

The prime numbers in the first row are 2, 3, 5 and 7.

Even and Odd Numbers

Every even composite number can be expressed as the sum of two prime numbers.

A number which is a multiple of 2 is called an **even number**.

A number which is not multiple of 2 is called an **odd number**. In other words, odd numbers are not exactly divisible by 2.

Even composite number	Sum of two prime numbers
4	$2+2$
6	$3+3$
8	$5+3$

> **REMEMBER**
> 2 is the only even prime number.

Express the following even composite numbers as the sum of two prime numbers.

1. 10 = _____ + _____
2. 12 = _____ + _____
3. 14 = _____ + _____
4. 28 = _____ + _____
5. 32 = _____ + _____
6. 36 = _____ + _____

Prime Factorisation

All composite numbers can be expressed as a product of their prime factors.

12 → 2×6 → 2×3

20 → 2×10 → 2×5

27 → 3×9 → 3×3

$12=2\times2\times3$ $20=2\times2\times5$ $27=3\times3\times3$

Composite numbers :	12	20	27
Prime factors:	2, 2, 3	2, 2, 5	3, 3, 3

A factorisation having each factor as prime is called the prime factorisation of the number.

Prime Factoristion Method

Factorisation by Division method

Example : Find the prime factorisation of 56 by the division method.

Solution : Write 56 as shown.

| 56

2	56
2	28
2	14
7	7
	1

Steps

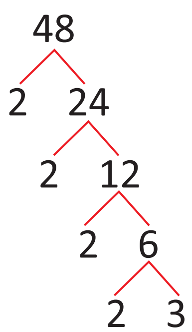
1. Divide 56 by the smallest prime factor i.e. 2. $56 \div 2 = 28$ (Write 28 as quotient below line as shown)
2. Divide 28 by the smallest prime factor i.e., 2 $28 \div 2 = 14$
3. Divide 14 by the smallest prime factor $14 \div 2 = 7$
4. Since, 7 is a prime number, no further factorisation is required.

Thus, the prime factorisation of 56 is $2 \times 2 \times 2 \times 7$.

Factorisation by factor-tree method

Example : Find the prime factorisation of 48 using the factor-tree method.

Solution :



Steps

1. We know that 48 is a composite number. Divide 48 by the smallest prime factor i.e. 2

   $48 \div 2 = 24$, So, we get the pair 2 and 24.

2. 24 is also a composite number. Divide it by the smallest prime number i.e., 2

   $24 \div 2 = 12$. S0, we get the pair of 2 and 12.

3. Similarly, $12 \div 2 = 6$. We get the pair of 2 and 6.
4. Again $6 \div 2 = 3$. We get the pair of prime numbers 2 and 3.

Therefore, the prime factorisation of 48 is $2 \times 2 \times 2 \times 2 \times 3$.

Mental Math

Experiential Learning

Find the prime factors using the prime factorisation method.

1. 42 2. 24 3. 36 4. 50 5. 63

6. 62 7. 81 8. 66 9. 65 10. 56

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Highest Common Factor (HCF)

The HCF of two or more numbers is the greatest number that is a factor of the given numbers.

Properties of Highest common factor

- The HCF of two or more numbers is their greatest common factor.
- The HCF of given numbers cannot be greater than the numbers themselves.
- If one number is a factor of another number, the smaller number is the HCF of the two numbers.

  For example, in the case of 3 and 15, 3 is a factor of 15 So, the HCF of 3 and 15 is 3.

- If the HCF of two numbers is 1, they are called **co-prime numbers**. For example, the HCF of 13 and 19 is 1. So, 13 and 19 are co-prime numbers or co-primes.
- Consecutive numbers are always co-prime. **For example**, 4 and 5 are co-prime numbers and so are 9 and 10.

How to obtained highest common factor?

Example 8 : Find the HCF of 12 and 18.

The factors of 12 are 1, 2, 3, 4, 6 and 12

The factors of 18 are 1, 2, 3, 6, 9 and 18

Factors of 12 :	1	2	3	4	6	12
Factors of 18 :	1	2	3	6	9	18

The common factors of 12 and 18 are 1, 2, 3 and 6.

The **highest common factor** (HCF) of 12 and 18 is 6.

Thus, HCF of 12 and 18 = 6

Check if both 12 and 18 are divisible by 6.

```
      2                3
6 ) 1 2          6 ) 1 8
  − 1 2            − 1 8
      0                0
```

12 and 18 are completely divisible by 6.

Finding the HCF factor method

Example 9 : Find the HCF of 8 and 20 using the factor method.

Factors of 8				Factors of 20		
1	×	8		1	×	20
2	×	4		2	×	10
				4	×	5

Factors of 8 =1, 2, 4, 8 Factors of 20 = 1, 2, 4, 5, 10, 20

Common factors = 1, 2, 4 so, HCF = 4

Therefore, the HCF of 8 and 20 is 4.

Prime factorisation method

Example 10 : Find the HCF of 18, 27 and 33 using the prime factorisation method.

Let us find the prime factors of each number.

$18 = 2 \times 9$ $\quad$ $27 = 3 \times 9$ $\quad$ $33 = 3 \times 11$

$= 2 \times 3 \times 3$ $\quad$ $= 3 \times 3 \times 3$

Thus, the HCF of 18, 27 and 33 is 3.

Example 11: Find the HCF of 24, 36 and 48.

Solution: Given numbers are 24, 36 and 48.

First, factorise them as follows.

2	24
2	12
2	6
3	3
	1

2	36
2	18
3	9
3	3
	1

2	48
2	24
2	12
2	6
3	3
	1

$24 = 2 \times 2 \times 2 \times 3$

$36 = 2 \times 2 \times 3 \times 3$

$48 = 2 \times 2 \times 2 \times 2 \times 3$

The common factors of 24, 36 and 48 are 2,2 and 3.

Hence, HCF of 24, 36 and 48 = $2 \times 2 \times 3 = 12$.

Long division method

Example 12: Find the HCF of 375 and 825.

Solution : The smaller number is 375. So, divide 825 by 375.

The remainder after the first division is 75. So in the second division, 75 is the divisor and 375 (i.e. the first divisor) is the divided . After the second division, the remainder is o. the last divisor is 75.

Thus, 75 is the HCF of 375 and 825.

375) 825 (2
− 750
75) 375 (5
− 375
0

HCF → 75

Example 13: Find the HCF of 35 and 49 by the long division method.

35) 49 (1
− 35
14) 35 (2
− 28
7) 14 (2
− 14
0

Thus, the HCF of 35 and 49 is 7.

Step 1 : Divide the bigger number (49) by the smaller number (35).

Step 2 : The remainder (14) becomes the new divisor, and the previous divisor (35) becomes the new dividend. Divide again.

Step 3 : Continue till you get the remainder 0.

Step 4 : The last divisor (7) is the HCF.

Exercise 4.2

Knowledge Application

1. Find the HCF by finding all the factors:

(a) 15, 30 (b) 24, 32, 56 (c) 27, 54 (d) 64, 72, 84

(e) 28, 36 (f) 20, 50, 90 (g) 36, 48, 96 (h) 45, 65, 75

2. Find the HCF using the prime factorisation method:

(a) 10, 16 (b) 15, 45 (c) 27, 30 (d) 28, 56

(e) 19, 20 (f) 60, 100 (g) 30, 75 (h) 25, 36

3. Find the HCF using the long division method:

(a) 64 and 80 (b) 35 and 49 (c) 48 and 68 (d) 88 and 168

(e) 65 and 135 (f) 32 and 128 (g) 78 and 98 (h) 644 and 1044

4. Find the prime factorisation of the following numbers using factor tree method:

(a) 72 (b) 96 (c) 100 (d) 56

(e) 104 (f) 40 (g) 99 (h) 36

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Lowest Common Multiple (LCM)

The lowest common multiple (LCM) of two or more numbers is the smallest multiple among all their multiples that can be divided by those numbers without leaving a remainder.

Properties of LCM

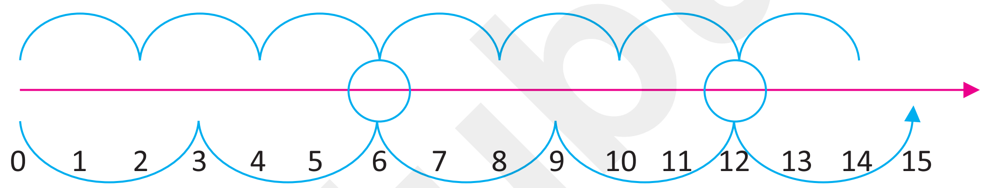
- The LCM of two or more numbers is their smallest common multiple.
- The LCM of two or more numbers is the smallest number that is completely divisible by each of the numbers. For example, the LCM of 8 and 6 is 24. 24 is completely divisible by 8 and 6.

$$\begin{array}{r} 3 \\ 8\overline{)\,24} \\ -24 \\ \hline 0 \end{array} \qquad \begin{array}{r} 4 \\ 6\overline{)\,24} \\ -24 \\ \hline 0 \end{array}$$

- The LCM of two or more number cannot be less than the numbers themselves.
- If one number is a factor of the other, the greater number is the LCM.
- For example, in the case of 3 and 15, 3 is a factor of 15. So, the LCM of 3 and 15 is 15.

Understanding LCM

Let us see the multiples of 2 and 3 on the number line.



Multiples of 2: 2, 4, 6, 8, 10, 12, 14, ...

Multiples of 3: 3, 6, 9, 12, 15, ...

Common multiples of 2 and 3 are 6, 12,....

Among the common multiples, the smallest multiple is 6.

The **LCM** or **lowest common multiple** of 2 and 3 is 6.

Finding the LCM

Prime factorisation method

Example 12 : Find the LCM of 28 and 30 using the prime factorisation method.

28 = 2 × 14 = 2 × 2 × 7

30 = 2 × 15 = 2 × 3 × 5

STEP 1: Write the prime factors of 28 and 30.

28 = 2 × 2 × 7

30 = 2 × 3 × 5

STEP 2: Circle the common factors.

LCM = 2 × 2 × 3 × 5 × 7 = 420

STEP 3: Multiply the common factors (only once) and the factors that are not common.

Thus, the LCM of 28 and 30 is 420.

Example 13 : Find the LCM of 10, 15 and 18 by the prime factorisation method.

$10 = 2 \times 5$ $15 = 3 \times 5$ $18 = 2 \times 9$

$= 2 \times 3 \times 3$

$10 = 2 \times 5$ $15 = 5 \times 3$ $18 = 2 \times 3 \times 3$

LCM $= 2 \times 5 \times 3 \times 3 = 90$

Thus, The LCM of 10, 15 and 18 is 90.

Short division method

This is a quicker method for finding LCM.

Example 14 : Find the LCM of 8 and 12.

2	**8**	12
2	**4**	6
2	**2**	3
3	**1**	3
	1	1

Step 1: Divide by the common prime factor and write the quotient below the numbers. If a number cannot be divided exactly, copy the number.

Step 2: Continue dividing by common prime factors writing the quotient below the number.

Step 3: Stop when there is no common prime factor.

LCM $= 2 \times 2 \times 2 \times 3 = 24$

Thus, the LCM of 8 and 12 is 24.

Example 15 : Find the LCM of 12, 16 and 24.

2	12	16	24
2	6	8	12
2	3	4	6
2	3	2	3
3	3	1	3
	1	1	1

LCM $= 2 \times 2 \times 2 \times 2 \times 3 = 48$

Thus, the LCM of 12, 16 and 24 is 48.

Exercise 4.3

Knowledge Application

1. Find the LCM using the prime factorisation method:

(a) 42, 70 (b) 15, 25, 30 (c) 24, 36 (d) 40, 32

(e) 20, 30, 50 (f) 18, 27 (g) 12, 15, 40 (h) 30, 45, 60

(i) 33, 22, 11 (j) 10, 15, 20 (k) 12, 15

2. Find the LCM by the short division method:

(a) 35, 70 (b) 72, 32 (c) 21, 14, 35 (d) 27, 54, 63

(e) 20, 65 (f) 30, 55 (g) 10, 15, 25 (h) 11, 24, 33

(i) 9, 27 (j) 12, 20 (k) 14, 16, 8

Take a Task Watch Remedial

Problems on HCF and LCM

Example 16 : Find the lowest number which is exactly divisible by 15 and 26.

Solution: We find the LCM of 15 and 30 to get the required number.

3	15
5	5
	1

2	20
2	10
2	5
	1

We have, 15 = 3 × 5 and 20 = 2 × 2 × 5

LCM of 15 and 20 = 2 × 2 × 3 × 5 = 60

Hence, 60 is the lowest number which is exactly divisible by 15 and 20

Example 17 : Two wires of length 18 m and 24 m each. The wires have to be cut into small pieces of same length. What can be the maximum length of each piece ?

Solution : To find the maximum length of the piece, we find the HCF of 18 and 24.

Factors of 18 = 1, 2, 3, 6, 9, 18

Factors of 24 = 1, 2, 3, 4, 6, 8, 12, 24

The common factors of 18 and 24 = 1, 2,3,6

The HCF of 18 and 24 = 6,

Therefore, the maximum length of each piece will be 6 m.

Example 18 : Find the lowest number which when divided by 6,8, and 12 leaves 3 a remainder in each case.

Solution:

2	6
3	3
	1

2	8
2	4
2	2
	1

2	12
2	6
2	3
	1

We have 6 = 2 × 3, 8 = 2 × 2 × 2 and 12 = 2 × 2 ×3.

The LCM of 6, 8 and 12 is = 2 × 2 × 2 × 3 = 24

Now, the required number = 24 + 3 = 27,

Hence, 27 is the lowest number which when divided by 6,8 and 12 leaves 3 as remainder in each case.

Exercise 4.4

Problem Solving

Answer the following questions:

1. Find the highest number which divides 27 and 45 exactly.
2. Find the lowest number which when divided by 8 and 9 leaves 3 as remainder in each case.
3. Find the highest number which divides 80 and 60 exactly.
4. Find the highest number by which 101 and 137 can be divided so as to leave the remainder 5 in each case.
5. Find the lowest number which when increased by 3 is divisible by 12, 16 and 18.
6. Find the lowest number which is exactly divisible by 11 and 17.

Think Tank

Gap Analyzer™
Take a Test

1. Tick (✓) the correct answer.

(a) 1, 2, 4, 5, 10 and 20 are the factor of ____________.

(i) 25 ☐ (ii) 30 ☐ (iii) 10 ☐ (iv) 20 ☐

(b) The smallest composite number that can be written as a product of 4 different prime number is ____________.

(i) 120 ☐ (ii) 210 ☐ (iii) 240 ☐ (iv) 180 ☐

(c) $3 \times 3 \times 3 \times 3 \times 3 \times 2$ is the prime factorization of ____________.

(i) 684 ☐ (ii) 486 ☐ (iii) 648 ☐ (iv) 624 ☐

2. Match the following:

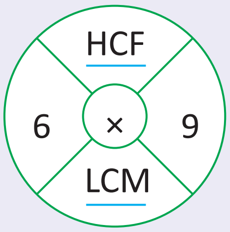
Column 'A'	Column 'B"
(a) $2 \times 2 \times 2 \times 3 \times 3 \times 5$	(i) 180
(b) $2 \times 2 \times 2 \times 3 \times 5 \times 5$	(ii) 360
(c) $2 \times 2 \times 3 \times 3 \times 5$	(iii) 900
(d) $2 \times 3 \times 3 \times 5 \times 5$	(iv) 600
(e) $2 \times 2 \times 3 \times 3 \times 5 \times 5$	(v) 450

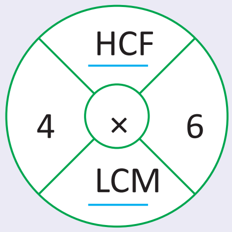
Custom Learning Path
Scan to Create Your Own Learning Path

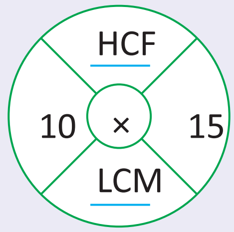
Puzzle

Conceptual Learning

Find the HCF and LCM.

1. 

2. 

3. 

Mental Math

Critical Thinking

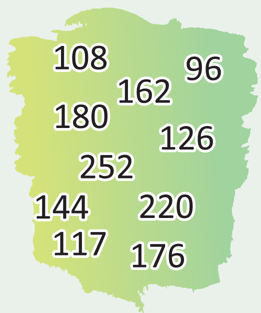
Tick the correct option:

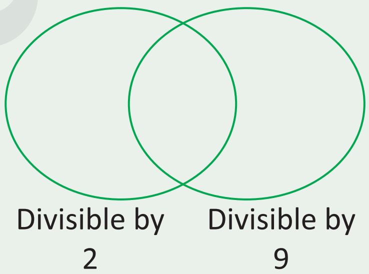
1. LCM of 10 and 25 is : (a) 250 (b) 50 (c) 100 (d) 200
2. HCF of 10 and 25 is : (a) 10 (b) 50 (c) 5 (d) 15
3. LCM of 10 and 21 is : (a) 1 (b) 105 (c) 210 (d) 120
4. HCF of 10 and 21 is : (a) 1 (b) 105 (c) 210 (d) 120

Fun Time Activity

Experiential Learning

The numbers given in the cloud should be placed in the circles given below. The numbers that are divisible by both 2 and 9 should be placed in the overlapping region.





Maths Lab Activity

Collaboration

Material required:

Square-lined paper and bindis of three colours

Procedure:

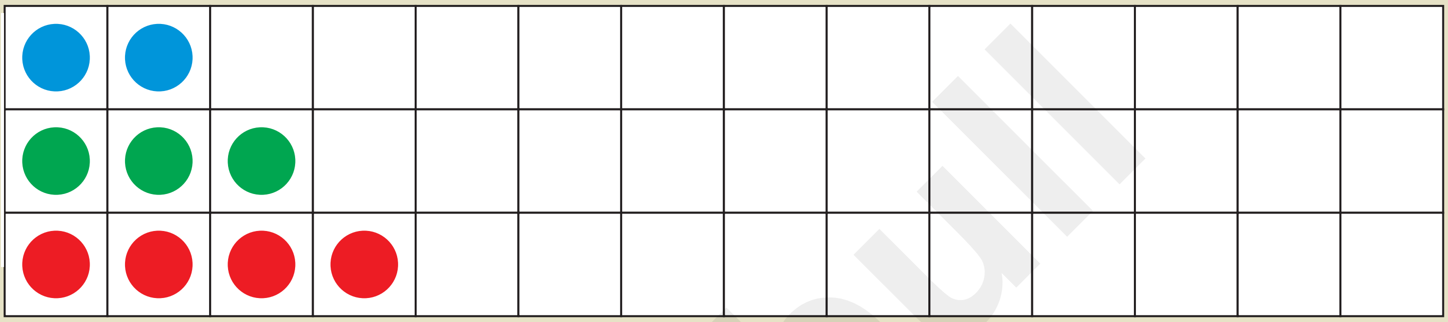
1. Work in groups of three students each.

2. Make a pattern of bindis. The pattern should consist of 3 layers. The lowest layer should have a block of 4 red bindis. The second layer should have a block of 3 green bindis. The top layer should have a block of 2 blue bindis.

3. Take turns to paste blocks of bindis to make the pattern of the shortest length possible with no bindi jutting out.

4. The pattern should look like this after the first round.

5. Continue pasting the bindis and record the length of the pattern. Discuss with your teacher.



Critical Thinking

In the neighbourhood of Balvidya Public School, there is a garment factory and a church. The school bell rings after every 40 minutes.

The factory siren gives out a ringing sound after every 50 minutes. The Church bell rings after every hour. If the bells and factory siren ring together at 8 a.m. What will be time when they go off together the second time.