# What are the Factors?

When a number is said to be a factor of any other second number, then the first number must divide the second number completely without leaving any remainder. In simple words, if a number (dividend) is exactly divisible by any number (divisor), then the divisor is a factor of that dividend. Every number has a common factor that is one and the number itself.
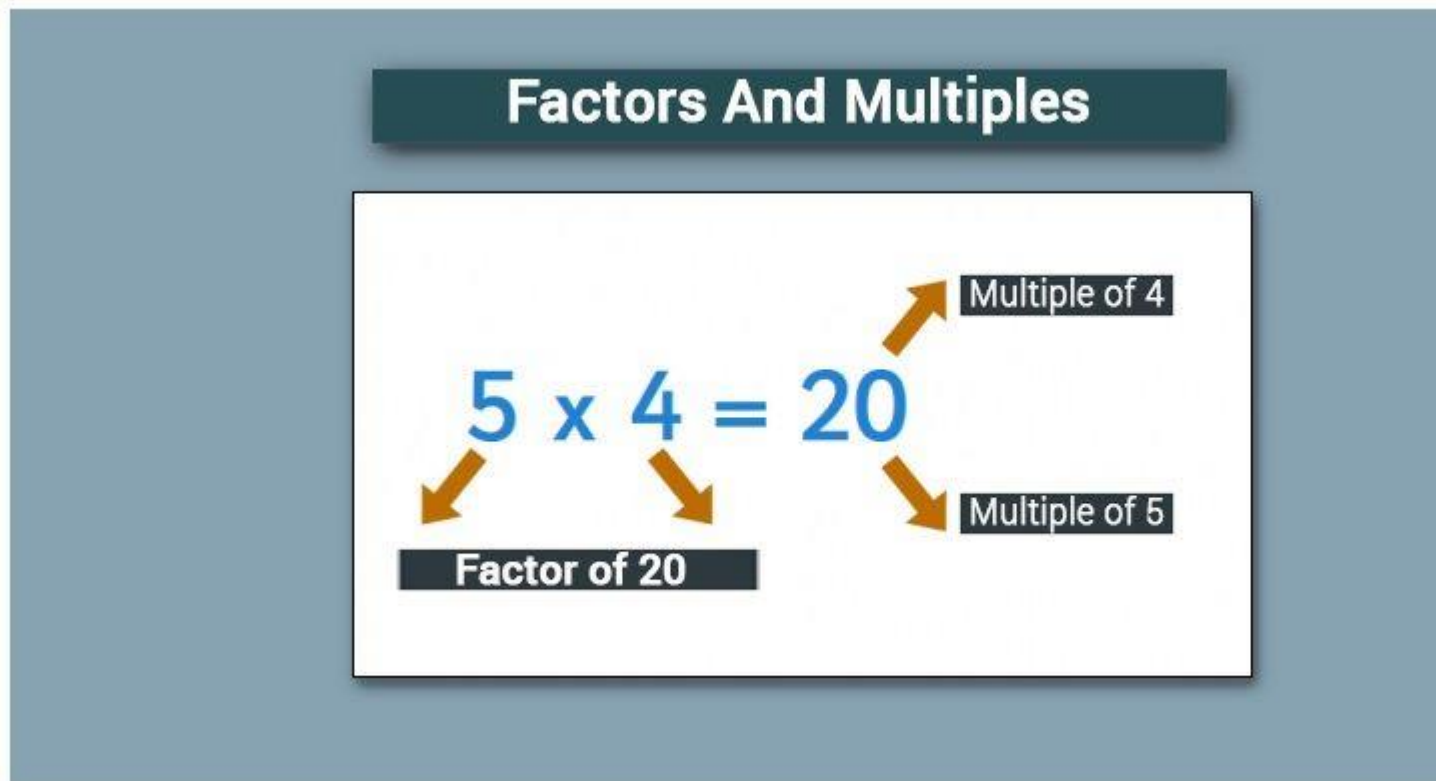
For example, 4 is a factor of 24, i.e. 4 divides 24 exactly giving 6 as quotient and leaving zero as remainder. Alternatively, 6 is also a factor of 24 as it gives 4 as quotient on division. Therefore, 24 has 1, 24, 4, 6 as its factors in addition to 2, 3, 8 and 12 and all these numbers divide 24 exactly leaving no remainder.

If any natural number has only two factors, i.e. 1 and the number itself as its factors, such numbers are called prime numbers. 2 is an example of a prime number where it has only two factors, i.e. 1 and 2.

What are Multiples?

A multiple of a number is a number that is the product of a given number and some other natural number. Multiples can be observed in a multiplication table. Multiples of some numbers are as follows:

Multiples of 2 are 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, and so on Hence, multiples of 2 will be even numbers and will end with 0, 2, 4, 6 or 8.

Multiples of 3 are 3, 6, 9, 12, 15, 18, 21, and so on.

Multiples of 5 are 5, 10, 15, 20, 25, and so on.

Every multiple of 5 has its last digit as 0 or 5.

In the above-mentioned examples, say multiples of 2, the number 2 can be multiplied by infinite numbers to find the "n" number of multiples. Now, let us assume an example,

3 × 4 = 12

Here, 3 and 4 are the factors of 12,

12 is multiple of 3 and 4

Thus, we can conclude that if X and Y are two numbers and;

- If X divides Y, X is a factor of Y

- If Y is divisible by X, Y is a multiple of X

Since the number 1 divides every integer, it is a common factor of every integer. Also, every number is divisible by 1 and every number is a multiple of 1.

Difference Between Factors and Multiples

The difference between factors and multiples are given here in tabular form. Go through the below table to understand the difference between them.

S.No	Factors	Multiples
1	Factors are defined as the exact divisors of the given number	The multiples are defined as the numbers obtained when multiplied by other numbers
2	The number of factors is finite	The number of multiplies is infinite
3	The operation used to find the factors is a division	The operation used to find the multiples is a multiplication

4	The outcome of the factors should be less than or equal to the given number	The outcome of the multiples should be greater than or equal to the given number

Factors and Multiples Examples

Factors and Multiples Examples

Example 1:

Find the factors of 20.

Solution:

The factors of 20 are 1, 2, 4, 5, 10 and 20.

Because the number 20 is exactly divisible by these numbers leaving the remainder zero.

Example 2:

Find the multiples of 20.

Solution:

The multiples of 20 are 20, 40, 60, 80, 100, 120, …

Because

20 × 1 = 20

20 × 2 = 40,

20 × 3 = 60

20 × 4 = 80

20 × 5 = 100, and so on

Frequently Asked Questions on Factors and Multiples

Mention the factors of 36.

The factors of 36 are 1, 2, 3, 4, 6, 9, 12, 18, and 36.

Explain the factors and numbers.

A factor is a number that divides the given number exactly without a remainder, whereas a multiple is a number, and that number is a product of the given number with other numbers.

Write down the common multiples of 3 and 7.

The common multiples of 3 and 7 are 21, 42, and 63.

Define the proper factor.

The proper factor is the factor of the number except 1 and the number itself. For example, the factors of 15 are 1, 3, 5, and 15. Then, the proper factors of 15 are 3 and 5

What is the smallest factor of 9?

The factors of 9 are 1, 3 and 9. Then the smallest factor of 9 is 1.

To solve problems on the topic, download BYJU'S-The Learning App from Google Play Store and watch interactive videos. Also, take free tests to practice for exams. To study about other topics, visit http://www.byjus.com/ and browse among thousands of interesting articles.

Factors and Multiples

Factors and multiples are related to each other. A factor of a number is the number that divides it completely without leaving any remainder. For any given number we can represent it as p × q = z. Here we say z is a multiple of p and q. According to the definition of factors and multiples, p and q are factors of z, because z is divisible by p as well as q. For example, 6 × 2 = 12, so 6 and 2 are the factors of 12, and 12 is a multiple of 6 and 2.

How to Find Factors and Multiples?

To find factors and multiples of any given number, let say 'p', we have to find the list of numbers that divide the number 'p' without leaving any remainder. Here let us take an example of number 28. How can we find factors of 28?

Steps to Find Factors of a Number

1. Step 1: List the two numbers such that their product gives 28.

2. **Step 2:** Let's say we take 4 and 7 as the numbers.

3. **Step 3:** Here 28 is divisible by 4 and 7 without leaving any remainder.

4. **Step 4:** Hence, 28 can be factored in as 28 = 7 × 4.

5. **Step 5:** Further, there are finite numbers by which a number can be divided without leaving any remainder. List out the numbers. Here, in the case of 28, the numbers are 1, 2, 4, 7, 14, and 28.

6. **Step 6:** Factors of 28 can be listed as 1, 2, 4, 7, 14, and 28.

1 and the number itself are always the factors of the respective number.

Finding Multiples of a Number

Multiples of a number are the numbers that we get after multiplying the number by a

=

LearnPracticeDownload

Factors and Multiples

Factors and multiples are related to each other. A factor of a number is the number that divides it completely without leaving any remainder. For any given number we can represent it as p × q = z. Here we say z is a multiple of p and q. According to the definition of factors and multiples, p and q are factors of z, because z is divisible by p as well as q. For example, 6 × 2 = 12, so 6 and 2 are the factors of 12, and 12 is a multiple of 6 and 2.

How to Find Factors and Multiples?

To find factors and multiples of any given number, let say 'p', we have to find the list of numbers that divide the number 'p' without leaving any remainder. Here let us take an example of number 28. How can we find factors of 28?

Steps to Find Factors of a Number

7. **Step 1**: List the two numbers such that their product gives 28.

8. **Step 2**: Let's say we take 4 and 7 as the numbers.

9. **Step 3**: Here 28 is divisible by 4 and 7 without leaving any remainder.

10. **Step 4**: Hence, 28 can be factored in as 28 = 7 × 4.

11. **Step 5**: Further, there are finite numbers by which a number can be divided without leaving any remainder. List out the numbers. Here, in the case of 28, the numbers are 1, 2, 4, 7, 14, and 28.

12. **Step 6**: Factors of 28 can be listed as 1, 2, 4, 7, 14, and 28.

1 and the number itself are always the factors of the respective number.

Finding Multiples of a Number

Multiples of a number are the numbers that we get after multiplying the number by a whole number. Here, let us take the same example of number 28. How can we find multiples of 28? The multiples of 28 are all the numbers that result from the multiplication of 28 by another whole number. Let us look at the skip counting method shown in the image below. The skip counting method is one of the simplest methods to find the multiples of any given number.

Multiples of 28	Explanation
28	28 × 1
56	28 × 2 or 28 + 28
84	28 × 3 or 28 + 28 + 28
112	28 × 4 or 28 + 28 + 28 + 28

140	28 × 5 or 28 + 28 + 28 + 28 + 28
168	28 × 6 or 28 + 28 + 28 + 28 + 28 + 28

Here, 28, 56, 84, 112, 140, and 168 are a few multiples of 28. There are infinite multiples of any given number.

Common Factors and Multiples

In this section, you will learn how to find common factors and multiples of any number. We know that a factor is a number that exactly divides the given number. Hence, a factor is nothing but a divisor of the given number. To find the factors, we can use the multiplication as well as the division method. To check if two or more numbers have common factors between them we can follow the below steps:

1. Write the given numbers.

2. Write all the possible factors of the given numbers

3. Find the factors which are the same in both the numbers.

4. Encircle the common factors.

This way we can easily find common factors between two or more numbers. Let us look at some examples.

Common factors of 30 and 42:

Common Factors of 30 and 42

Factors of 30 are: 1, 2, 3, 5,

Factors of 42 are: 1, 2, 3, 6,

Therefore, the common factors of 30 and 42 are 1, 2, 3, and 6.

Here is another example with three numbers. The common factors of 42, 70, and 84 are shown in the image below.

Common Factors of 3 Numbers

Factors of **42** are:

| 1 | 2 | 3 | 6 | 7 | 14 | 21 |

Factors of **70** are:

| 1 | 2 | 5 | 7 | 10 | 14 | 35 |

Factors of **84** are:

| 1 | 2 | 3 | 4 | 6 | 7 | 12 |

Hence the common factors of 42, 70, and 84 are 1, 2, 7, and 14. Now let us look at ways to find common multiples.

There are various methods to find common multiples. Two of such ways are:

1. Listing multiples method. In this, we list the multiples of each number and then we find their common multiples. It is one of the simplest methods by which we can find the common multiples of two or more numbers.

2. Venn diagram method

Let us use the Venn diagram method. First, mark the multiples of any 2 numbers, let's say 3 and 4 in two separate circles. Look for the common numbers coming in both circles. The circle of multiples of 3 intersects with the circle of multiples of 4. The intersection part has the common multiples that belong to 3 as well as 4. Please note that there are infinite numbers of common multiples for every pair of numbers. The first three common multiples of 3 and 4 are 12, 24, and 36.

Common Multiples of 3 and 4

Multiples of 3 ⟶

⟶ Mu

3, 6, 9
15, 18, 21
27, 30, 33

12
24
36

4, 8
16, 20
28, 32
40

**Common multiples
of 3 and 4**
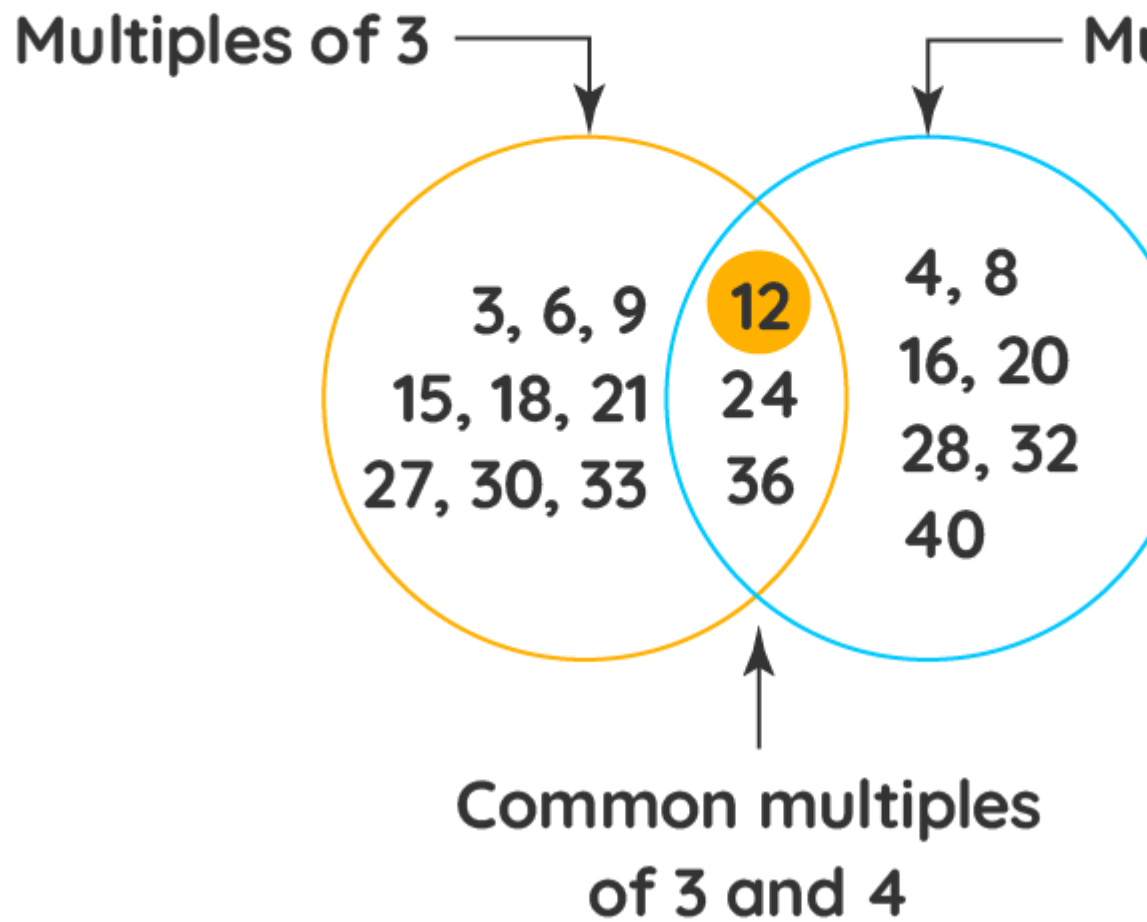
Now, let us look at an example of the listing multiples method. To find the common multiples of 2 and 4, we list their multiples and then find their common multiples.

1. Multiples of 2: 2, 4, 6, 8, 10, 12, 14, 16, 18, 20. 22, 24, etc.

2. Multiples of 4: 4, 8, 12, 16, 20, 24, 28, 32, 36, 40, etc.

3. Common multiples of 2 and 4: 4, 8, 12, 16, 20, 24, etc …

If a number is a factor of another number, then their common multiples are all the multiples of the larger number (as in the above example).

Properties of Factors and Multiples

There are many properties of factors and multiples that will help you to understand this concept properly. Those properties are listed below:

1. 1 is the factor of every number.

2. 0 is the multiple of every number.

3. Factors and multiples are only used and applicable to whole numbers.

4. For every number, 1 is the smallest factor and that number itself is the largest factor.

5. Every number is a multiple of itself.

6. There are an infinite number of multiples and a finite number of factors possible for every number.

7. If there are only two factors of a number, i.e 1 and the number itself, that number is known as a prime number in math.

Important Notes

1. Multiples of any number are infinite. Therefore, a set of any two numbers can have an infinite number of common multiples.

2. The Least Common Multiple (LCM) is the smallest common multiple of sets of any two or more numbers. For example, the LCM of 3 and 4 is 12.

Related Articles on Factors and Multiples

Check these interesting articles related to the concept of factors and multiples grade 5