[Solved] What is the least common multiple of 3 and 20?

LCM of 3 and 20 - How to Find LCM of 3, 20?

LCM of 3 and 20 is the smallest number among all common multiples of 3 and 20. The first few multiples of 3 and 20 are (3, 6, 9, 12, 15, 18, . . .) and (20, 40, 60, 80, . . .) respectively. There are 3 commonly used methods to find LCM of 3 and 20 - by prime factorization, by listing multiples, and by division method.

What is the LCM of 3 and 20?

Answer: LCM of 3 and 20 is 60.

LCM of (3 and 20) = 60

Explanation:

The LCM of two non-zero integers, x(3) and y(20), is the smallest positive integer m(60) that is divisible by both x(3) and y(20) without any remainder.

Methods to Find LCM of 3 and 20

Let's look at the different methods for finding the LCM of 3 and 20.

- By Listing Multiples
- By Prime Factorization Method
- By Division Method

LCM of 3 and 20 by Listing Multiples

To calculate the LCM of 3 and 20 by listing out the common multiples, we can follow the given below steps:

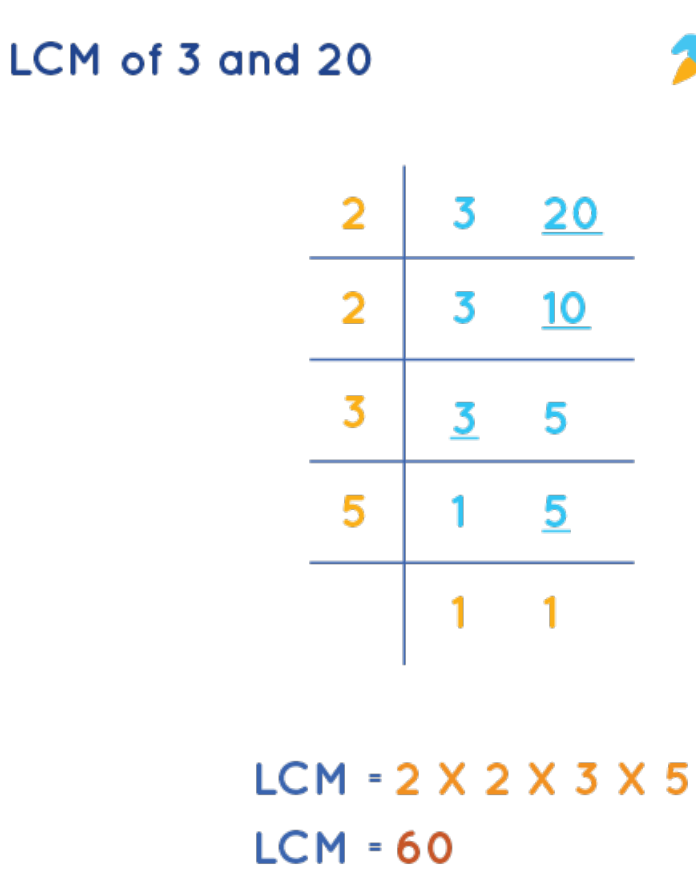
- Step 1: List a few multiples of 3 (3, 6, 9, 12, 15, 18, . . .) and 20 (20, 40, 60, 80, ...)
- Step 2: The common multiples from the multiples of 3 and 20 are 60, 120, . . .
- Step 3: The smallest common multiple of 3 and 20 is 60.

∴ The least common multiple of 3 and 20 = 60.

LCM of 3 and 20 by Prime Factorization

Prime factorization of 3 and 20 is (3) = 3^1 and (2 × 2 × 5) = $2^2 \times 5^1$ respectively. LCM of 3 and 20 can be obtained by multiplying prime factors raised to their respective highest power, i.e. $2^2 \times 3^1 \times 5^1 = 60$. Hence, the LCM of 3 and 20 by prime factorization is 60.

LCM of 3 and 20 by Division Method



To calculate the LCM of 3 and 20 by the division method, we will divide the numbers(3, 20) by their prime factors (preferably common). The product of these divisors gives the LCM of 3 and 20.

- Step 1: Find the smallest prime number that is a factor of at least one of the numbers, 3 and 20. Write this prime number(2) on the left of the given numbers(3 and 20), separated as per the ladder arrangement.
- Step 2: If any of the given numbers (3, 20) is a multiple of 2, divide it by 2 and write the quotient below it. Bring down any number that is not divisible by the prime number.
- Step 3: Continue the steps until only 1s are left in the last row.

The LCM of 3 and 20 is the product of all prime numbers on the left, i.e. LCM(3, 20) by division method = 2 × 2 × 3 × 5 = 60.

☛ Also Check:

- LCM of 49 and 63 - 441
- LCM of 12, 14 and 16 - 336
- LCM of 18 and 48 - 144
- LCM of 48 and 72 - 144
- LCM of 36 and 90 - 180
- LCM of 10 and 30 - 30
- LCM of 70 and 90 - 630

FAQs on LCM of 3 and 20

What is the LCM of 3 and 20?

The LCM of 3 and 20 is 60. To find the LCM of 3 and 20, we need to find the multiples of 3 and 20 (multiples of 3 = 3, 6, 9, 12 . . . . 60; multiples of 20 = 20, 40, 60, 80) and choose the smallest multiple that is exactly divisible by 3 and 20, i.e., 60.

What are the Methods to Find LCM of 3 and 20?

The commonly used methods to find the LCM of 3 and 20 are:

- Prime Factorization Method
- Division Method

- Listing Multiples

What is the Relation Between GCF and LCM of 3, 20?

The following equation can be used to express the relation between GCF and LCM of 3 and 20, i.e. GCF × LCM = 3 × 20.

If the LCM of 20 and 3 is 60, Find its GCF.

LCM(20, 3) × GCF(20, 3) = 20 × 3 Since the LCM of 20 and 3 = 60 ⇒ 60 × GCF(20, 3) = 60 Therefore, the greatest common factor (GCF) = 60/60 = 1.

How to Find the LCM of 3 and 20 by Prime Factorization?

To find the LCM of 3 and 20 using prime factorization, we will find the prime factors, (3 = 3) and (20 = 2 × 2 × 5). LCM of 3 and 20 is the product of prime factors raised to their respective highest exponent among the numbers 3 and 20. ⇒ LCM of 3, 20 = 22 × 31 × 51 = 60.

Least Common Multiple of 20 and 3 LCM(20,3)

Least common multiple or lowest common denominator (lcd) can be calculated in two way; with the LCM formula calculation of greatest common factor (GCF), or multiplying the prime factors with the highest exponent factor.

Least common multiple (LCM) of 20 and 3 is 60.

LCM(20,3) = 60

Least Common Multiple of 20 and 3 with GCF Formula

The formula of LCM is LCM(a,b) = (a × b) / GCF(a,b). We need to calculate greatest common factor 20 and 3, than apply into the LCM equation.

GCF(20,3) = 1 LCM(20,3) = (20 × 3) / 1 LCM(20,3) = 60 / 1 LCM(20,3) = 60

Least Common Multiple (LCM) of 20 and 3 with Primes

Least common multiple can be found by multiplying the highest exponent prime factors of 20 and 3. First we will calculate the prime factors of 20 and 3.

Prime Factorization of 20

Prime factors of 20 are 2, 5. Prime factorization of 20 in exponential form is:

20 = 22 × 51

Prime Factorization of 3

Prime factors of 3 are 3. Prime factorization of 3 in exponential form is:

3 = 31

Now multiplying the highest exponent prime factors to calculate the LCM of 20 and 3.

LCM(20,3) = 22 × 51 × 31 LCM(20,3) = 60

Least Common Multiple of 3 and 20 LCM(3,20)

Least common multiple or lowest common denominator (lcd) can be calculated in two way; with the LCM formula calculation of greatest common factor (GCF), or multiplying the prime factors with the highest exponent factor.

Least common multiple (LCM) of 3 and 20 is 60.

LCM(3,20) = 60

Least Common Multiple of 3 and 20 with GCF Formula

The formula of LCM is LCM(a,b) = (a × b) / GCF(a,b). We need to calculate greatest common factor 3 and 20, than apply into the LCM equation.

GCF(3,20) = 1 LCM(3,20) = (3 × 20) / 1 LCM(3,20) = 60 / 1 LCM(3,20) = 60

Least Common Multiple (LCM) of 3 and 20 with Primes

Least common multiple can be found by multiplying the highest exponent prime factors of 3 and 20. First we will calculate the prime factors of 3 and 20.

Prime Factorization of 3

Prime factors of 3 are 3. Prime factorization of 3 in exponential form is:

3 = 31

Prime Factorization of 20

Prime factors of 20 are 2, 5. Prime factorization of 20 in exponential form is:

20 = 22 × 51

Now multiplying the highest exponent prime factors to calculate the LCM of 3 and 20.

LCM(3,20) = 31 × 22 × 51 LCM(3,20) = 60

Find LCM of 3 and 20

The LCM of 3 and 20 is 60.

Steps to find LCM

1. Find the prime factorization of 33 = 3
2. Find the prime factorization of 2020 = 2 × 2 × 5
3. Multiply each factor the greater number of times it occurs in steps i) or ii) above to find the LCM:

   LCM = 2 × 2 × 3 × 5

4. LCM = 60

MathStep (Works offline)


Download our mobile app and learn how to find LCM of upto four numbers in your own time: Android and iPhone/ iPad

Find least common multiple (LCM) of: 6 & 40 9 & 60 15 & 100 21 & 140 6 & 20 3 & 40 9 & 20 3 & 60 15 & 20 3 & 100 21 & 20 3 & 140

Least Common Multiple Calculator

Please provide numbers separated by a comma "," and click the "Calculate" button to find the LCM.

What is the Least Common Multiple (LCM)?

In mathematics, the least common multiple, also known as the lowest common multiple of two (or more) integers a and b, is the smallest positive integer that is divisible by both. It is commonly denoted as LCM(a, b).

Brute Force Method

There are multiple ways to find a least common multiple. The most basic is simply using a "brute force" method that lists out each integer's multiples.

EX: Find LCM(18, 26) 18: 18, 36, 54, 72, 90, 108, 126, 144, 162, 180, 198, 216, 234 26: 52, 78, 104, 130, 156, 182, 208, 234

As can be seen, this method can be fairly tedious, and is far from ideal.

Prime Factorization Method

A more systematic way to find the LCM of some given integers is to use prime factorization. Prime factorization involves breaking down each of the numbers being compared into its product of prime numbers. The LCM is then determined by multiplying the highest power of each prime number together. Note that computing the LCM this way, while more efficient than using the "brute force" method, is still limited to smaller numbers. Refer to the example below for clarification on how to use prime factorization to determine the LCM:

EX: Find LCM(21, 14, 38) $21 = 3 \times 7$ $14 = 2 \times 7$ $38 = 2 \times 19$

The LCM is therefore: $3 \times 7 \times 2 \times 19 = 798$

Greatest Common Divisor Method

A third viable method for finding the LCM of some given integers is using the greatest common divisor. This is also frequently referred to as the greatest common factor (GCF), among other names. Refer to the link for details on how to determine the greatest common divisor. Given LCM(a, b), the procedure for finding the LCM using GCF is to divide the product of the numbers a and b by their GCF, i.e. $(a \times b)/GCF(a,b)$. When trying to determine the LCM of more than two numbers, for example LCM(a, b, c) find the LCM of a and b where the result will be q. Then find the LCM of c and q. The result will be the LCM of all three numbers. Using the previous example:

EX: Find LCM(21, 14, 38)

GCF(14, 38) = 2

GCF(266, 21) = 7 LCM(21, 14, 38) = 798

Note that it is not important which LCM is calculated first as long as all the numbers are used, and the method is followed accurately. Depending on the particular situation, each method has its own merits, and the user can decide which method to pursue at their own discretion.

LCM Calculator - Least Common Multiple

Calculator Use

The Least Common Multiple (LCM) is also referred to as the Lowest Common Multiple (LCM) and Least Common Divisor (LCD). For two integers a and b, denoted LCM(a,b), the LCM is the smallest positive integer that is evenly divisible by both a and b. For example, LCM(2,3) = 6 and LCM(6,10) = 30.

The LCM of two or more numbers is the smallest number that is evenly divisible by all numbers in the set.

Least Common Multiple Calculator

Find the LCM of a set of numbers with this calculator which also shows the steps and how to do the work.

Input the numbers you want to find the LCM for. You can use commas or spaces to separate your numbers. But do not use commas within your numbers. For example, enter 2500, 1000 and not 2,500, 1,000.

How to Find the Least Common Multiple LCM

This LCM calculator with steps finds the LCM and shows the work using 6 different methods:

- Listing Multiples
- Prime Factorization
- Cake/Ladder Method
- Division Method
- Using the Greatest Common Factor GCF
- Venn Diagram

How to Find LCM by Listing Multiples

- List the multiples of each number until at least one of the multiples appears on all lists
- Find the smallest number that is on all of the lists
- This number is the LCM

Example: LCM(6,7,21)

- Multiples of 6: 6, 12, 18, 24, 30, 36, 42, 48, 54, 60

- Multiples of 7: 7, 14, 21, 28, 35, 42, 56, 63
- Multiples of 21: 21, 42, 63
- Find the smallest number that is on all of the lists. We have it in bold above.
- So LCM(6, 7, 21) is 42

How to find LCM by Prime Factorization

- Find all the prime factors of each given number.
- List all the prime numbers found, as many times as they occur most often for any one given number.
- Multiply the list of prime factors together to find the LCM.

The LCM(a,b) is calculated by finding the prime factorization of both a and b. Use the same process for the LCM of more than 2 numbers.

For example, for LCM(12,30) we find:

- Prime factorization of 12 = 2 × 2 × 3
- Prime factorization of 30 = 2 × 3 × 5
- Using all prime numbers found as often as each occurs most often we take 2 × 2 × 3 × 5 = 60
- Therefore LCM(12,30) = 60.

For example, for LCM(24,300) we find:

- Prime factorization of 24 = 2 × 2 × 2 × 3
- Prime factorization of 300 = 2 × 2 × 3 × 5 × 5
- Using all prime numbers found as often as each occurs most often we take 2 × 2 × 2 × 3 × 5 × 5 = 600
- Therefore LCM(24,300) = 600.

How to find LCM by Prime Factorization using Exponents

- Find all the prime factors of each given number and write them in exponent form.
- List all the prime numbers found, using the highest exponent found for each.
- Multiply the list of prime factors with exponents together to find the LCM.

Example: LCM(12,18,30)

- Prime factors of 12 = 2 × 2 × 3 = $2^2 \times 3^1$
- Prime factors of 18 = 2 × 3 × 3 = $2^1 \times 3^2$
- Prime factors of 30 = 2 × 3 × 5 = $2^1 \times 3^1 \times 5^1$
- List all the prime numbers found, as many times as they occur most often for any one given number and multiply them together to find the LCM
  - 2 × 2 × 3 × 3 × 5 = 180
- Using exponents instead, multiply together each of the prime numbers with the highest power
  - $2^2 \times 3^2 \times 5^1 = 180$
- So LCM(12,18,30) = 180

Example: LCM(24,300)

- Prime factors of 24 = 2 × 2 × 2 × 3 = $2^3 \times 3^1$
- Prime factors of 300 = 2 × 2 × 3 × 5 × 5 = $2^2 \times 3^1 \times 5^2$
- List all the prime numbers found, as many times as they occur most often for any one given number and multiply them together to find the LCM
  - 2 × 2 × 2 × 3 × 5 × 5 = 600
- Using exponents instead, multiply together each of the prime numbers with the highest power
  - $2^3 \times 3^1 \times 5^2 = 600$
- So LCM(24,300) = 600

How to Find LCM Using the Cake Method (Ladder Method)

The cake method uses division to find the LCM of a set of numbers. People use the cake or ladder method as the fastest and easiest way to find the LCM because it is simple division.

The cake method is the same as the ladder method, the box method, the factor box method and the grid method of shortcuts to find the LCM. The boxes and grids might look a little different, but they all use division by primes to find LCM.

Find the LCM(10, 12, 15, 75)

- Write down your numbers in a cake layer (row)

- Divide the layer numbers by a prime number that is evenly divisible into two or more numbers in the layer and bring down the result into the next layer.
- If any number in the layer is not evenly divisible just bring down that number.
- Continue dividing cake layers by prime numbers.
- When there are no more primes that evenly divided into two or more numbers you are done.
- The LCM is the product of the numbers in the L shape, left column and bottom row. 1 is ignored.
- LCM = 2 × 3 × 5 × 2 × 5
- LCM = 300
- Therefore, LCM(10, 12, 15, 75) = 300

How to Find the LCM Using the Division Method

Find the LCM(10, 18, 25)

- Write down your numbers in a top table row
- Starting with the lowest prime numbers, divide the row of numbers by a prime number that is evenly divisible into at least one of your numbers and bring down the result into the next table row.
- If any number in the row is not evenly divisible just bring down that number.
- Continue dividing rows by prime numbers that divide evenly into at least one number.
- When the last row of results is all 1's you are done.
- The LCM is the product of the prime numbers in the first column.
- LCM = 2 × 3 × 3 × 5 × 5
- LCM = 450
- Therefore, LCM(10, 18, 25) = 450

How to Find LCM by GCF

The formula to find the LCM using the Greatest Common Factor GCF of a set of numbers is:

LCM(a,b) = (a×b)/GCF(a,b)

Example: Find LCM(6,10)

- Find the GCF(6,10) = 2
- Use the LCM by GCF formula to calculate (6×10)/2 = 60/2 = 30
- So LCM(6,10) = 30

A factor is a number that results when you can evenly divide one number by another. In this sense, a factor is also known as a divisor.

The greatest common factor of two or more numbers is the largest number shared by all the factors.

The greatest common factor GCF is the same as:

- HCF - Highest Common Factor
- GCD - Greatest Common Divisor
- HCD - Highest Common Divisor
- GCM - Greatest Common Measure
- HCM - Highest Common Measure

How to Find the LCM Using Venn Diagrams

Venn diagrams are drawn as overlapping circles. They are used to show common elements, or intersections, between 2 or more objects. In using Venn diagrams to find the LCM, prime factors of each number, we call the groups, are distributed among overlapping circles to show the intersections of the groups. Once the Venn diagram is completed you can find the LCM by finding the union of the elements shown in the diagram groups and multiplying them together.

How to Find LCM of Decimal Numbers

- Find the number with the most decimal places
- Count the number of decimal places in that number. Let's call that number D.

- For each of your numbers move the decimal D places to the right. All numbers will become integers.
- Find the LCM of the set of integers
- For your LCM, move the decimal D places to the left. This is the LCM for your original set of decimal numbers.

Properties of LCM

The LCM is associative:

LCM(a, b) = LCM(b, a)

The LCM is commutative:

LCM(a, b, c) = LCM(LCM(a, b), c) = LCM(a, LCM(b, c))

The LCM is distributive:

LCM(da, db, dc) = dLCM(a, b, c)

The LCM is related to the greatest common factor (GCF):

LCM(a,b) = a × b / GCF(a,b) and

GCF(a,b) = a × b / LCM(a,b)

References

[1] Zwillinger, D. (Ed.). CRC Standard Mathematical Tables and Formulae, 31st Edition, New York, NY: CRC Press, 2003 p. 101.

[2] Weisstein, Eric W. Least Common Multiple. From MathWorld--A Wolfram Web Resource.

LCM Calculator to calculate the Least Common Multiple of 3, 20 - lcmgcf.com

Least common multiple can be found by multiplying the highest exponent prime factors of 3 and 20. First we will calculate the prime factors of 3 and 20.

Prime Factorization of 3

Prime factors of 3 are 3. Prime factorization of 3 in exponential form is:

3 = 31

Prime Factorization of 20

Prime factors of 20 are 2,5. Prime factorization of 20 in exponential form is:

20 = 22×51

Now multiplying the highest exponent prime factors to calculate the LCM of 3 and 20.

LCM(3,20) = 22×31×51LCM(3,20) = 60

Factors of 3

List of positive integer factors of 3 that divides 3 without a remainder.

1, 3

Factors of 20

List of positive integer factors of 20 that divides 20 without a remainder.

1, 2, 4, 5, 10, 20

The formula of LCM is LCM(a,b) = (a × b) / GCF(a,b).We need to calculate greatest common factor 3 and 20, than apply into the LCM equation.

GCF(3,20) = 1LCM(3,20) = (3 × 20) / 1LCM(3,20) = 60 / 1LCM(3,20) = 60

(i) The LCM of 20 and 3 is associative

LCM of 3 and 20 = LCM of 20 and 3

1. What is the LCM of 3 and 20?

Answer: LCM of 3 and 20 is 60.

2. What are the Factors of 3?

Answer: Factors of 3 are 1, 3. There are 2 integers that are factors of 3. The greatest factor of 3 is 3.

3. What are the Factors of 20?

Answer: Factors of 20 are 1, 2, 4, 5, 10, 20. There are 6 integers that are factors of 20. The greatest factor of 20 is 20.

4. How to Find the LCM of 3 and 20?

Answer:

Least Common Multiple of 3 and 20 = 60

Step 1: Find the prime factorization of 3

3 = 3

Step 2: Find the prime factorization of 20

20 = 2 x 2 x 5

Step 3: Multiply each factor the greater number of times it occurs in steps i) or ii) above to find the lcm:

LCM = 60 = 2 x 2 x 3 x 5

Step 4: Therefore, the least common multiple of 3 and 20 is 60.