

Grade 6 - Greatest Common Factor and Least Common Multiple - Lesson

Common Core 6.NS.B.4 · maths-pdf.fr/en/

The **greatest common factor (GCF)** of two numbers is the largest number that divides both, and the **least common multiple (LCM)** is the smallest number that both divide into. For 12 and 18, the GCF is 6 and the LCM is 36. Use the GCF to write $36 + 48$ as $12(3 + 4)$.

Grade 6 · Common Core State Standards: **6.NS.B.4**

Key facts

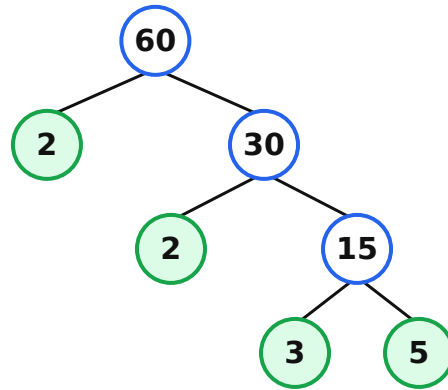
- A factor divides a number evenly; a multiple is a product with a whole number.
- The GCF is the largest shared factor.
- The LCM is the smallest shared multiple.
- Prime factorization helps: use the smaller exponents for the GCF and the greater for the LCM.
- The GCF lets you write a sum as GCF times a sum, such as $36 + 48 = 12(3 + 4)$.

What are factors and multiples?

A **factor** of a number divides it with no remainder. The factors of 12 are 1, 2, 3, 4, 6, and 12. A **multiple** is the result of multiplying a number by a whole number. The multiples of 4 are 4, 8, 12, 16, and so on.

GCF and LCM

The **greatest common factor (GCF)** of two numbers is the largest number that divides both. The **least common multiple (LCM)** is the smallest positive number that is a multiple of both.



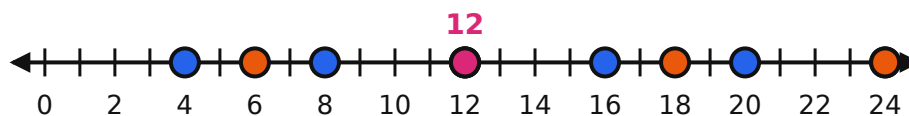
A factor tree breaks 60 into primes: 2, 2, 3, and 5.

How do you find the GCF?

List the factors of each number and pick the greatest one they share. For 24 and 36, the common factors are 1, 2, 3, 4, 6, and 12, so the GCF is 12. You can also use prime factorizations: $24 = 2^3 \times 3$ and $36 = 2^2 \times 3^2$. Multiply the common primes with their smaller exponents: $2^2 \times 3 = 12$.

How do you find the LCM?

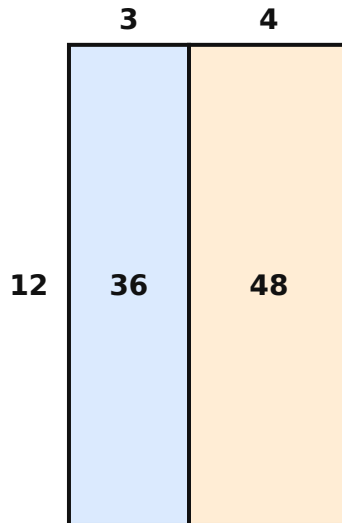
List multiples of each number until one appears on both lists. Multiples of 4: 4, 8, 12. Multiples of 6: 6, 12. The LCM of 4 and 6 is 12. With primes, multiply each prime using its greater exponent.



Multiples of 4 are blue and multiples of 6 are orange. The first shared multiple is 12.

How does the GCF help with the distributive property?

If two numbers share a factor, pull it out. Since the GCF of 36 and 48 is 12, write $36 + 48 = 12(3 + 4)$. The area model shows two rectangles with the same height 12.

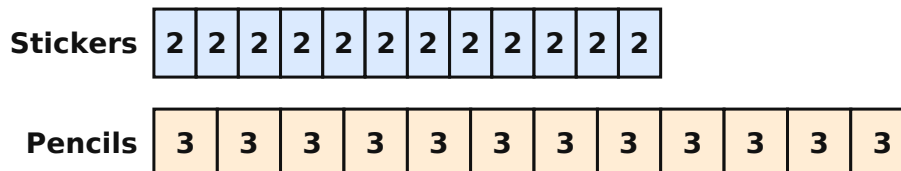


The GCF 12 factors out: $36 + 48 = 12(3 + 4)$.

1. Find the GCF of the two numbers.
2. Divide each number by the GCF.
3. Write GCF times the sum of the quotients.
4. Check by multiplying: $12 \times 7 = 84$ and $36 + 48 = 84$.

When do you use GCF and when do you use LCM?

Use the GCF when you split things into equal groups with nothing left over, such as 24 stickers and 36 pencils in identical bags. Use the LCM when events repeat and you want to know when they match, such as buses that leave every 6 and 8 minutes.



Twelve identical bags, each with 2 stickers and 3 pencils.

Questions about greatest common factor and least common multiple

What is the greatest common factor?

The GCF is the largest number that divides two numbers evenly. The GCF of 24 and 36 is 12.

What is the least common multiple?

The LCM is the smallest number that is a multiple of both numbers. The LCM of 4 and 6 is 12.

How do you find the GCF with prime factorization?

Write each number as a product of primes and multiply the primes they share, using the smaller exponent of each. For 84 and 126, the shared primes are 2, 3, and 7, so the GCF is 42.

How do you use the GCF to rewrite a sum?

Divide each addend by the GCF and write the GCF times the sum of the quotients. For $36 + 48$, the GCF is 12, so the sum is $12(3 + 4)$.

How do you know whether a word problem needs GCF or LCM?

If you split items into identical groups, find the GCF. If events repeat and you want the next time they happen together, find the LCM.