

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

Common Core 6.NS.B.4 · mathovore.fr

The greatest common factor (GCF) of two numbers is the largest number that divides both evenly. The least common multiple (LCM) is the smallest nonzero number that both divide into evenly. Use prime factorization to find the GCF, list multiples to find the LCM, and use the GCF to rewrite sums like $36+8$ as $4(9+2)$.

Grade 6 Common Core: 6.NS.B.4

Key facts:

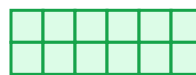
- A prime number has exactly two factors: 1 and itself.
- GCF: multiply the prime factors that both numbers share.
- LCM: list multiples of the larger number until the smaller number divides one.
- Use the GCF to split items into equal groups; use the LCM for repeating cycles.
- A sum can be factored with the GCF: $36+8=4(9+2)$.

What are factors, multiples, and prime factorization?

A factor is a whole number that divides another number with no remainder; the factors of 12 are 1, 2, 3, 4, 6, and 12. A multiple is what you get when you multiply a number by 1, 2, 3, and so on. A prime number has exactly two factors, 1 and itself. Every whole number greater than 1 is either prime or a product of primes.



$$1 \times 12$$



$$2 \times 6$$



$$3 \times 4$$

Factor pairs of 12 shown as rectangles.

Key definitions

Greatest common factor (GCF): the largest number that is a factor of both numbers.

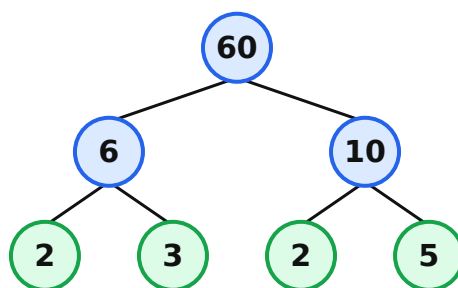
Least common multiple (LCM): the smallest nonzero number that is a multiple of both

numbers.

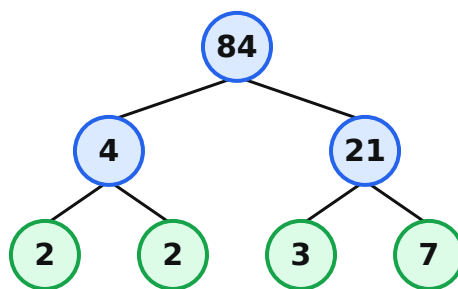
How do you find the greatest common factor?

Write each number as a product of primes, then multiply the primes the two numbers share. Here is the method for 60 and 84.

1. Factor 60: $60 = 2 \times 2 \times 3 \times 5$.
2. Factor 84: $84 = 2 \times 2 \times 3 \times 7$.
3. Circle the primes that appear in both lists: 2, 2, and 3.
4. Multiply them: $2 \times 2 \times 3 = 12$.
5. Check: $60 \div 12 = 5$ and $84 \div 12 = 7$, and 5 and 7 share no factor except 1.



Factor tree of 60: primes 2, 2, 3, 5.



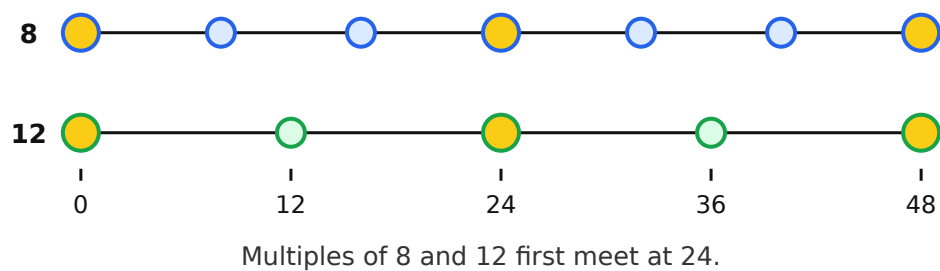
Factor tree of 84: primes 2, 2, 3, 7.

The GCF of 60 and 84 is 12. For small numbers you can also list all factor pairs and pick the largest one they share.

How do you find the least common multiple?

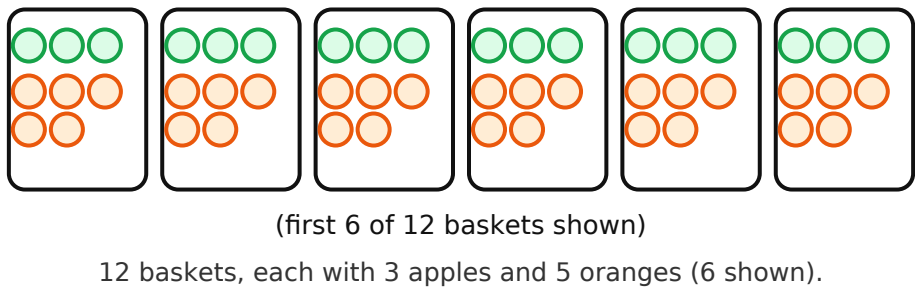
List multiples of the larger number until you reach one that the smaller number also divides. For 8 and 12, the multiples of 12 are 12, 24, and 24 is divisible by 8 ($8 \times 3 = 24$). So the LCM of 8 and 12 is 24. Use the LCM when events repeat on a cycle, such as buses that leave every 8

and every 12 minutes.



How does the distributive property use the GCF?

You can pull the GCF out of a sum to write it as a product: $36+8=4(9+2)$. Both 36 and 8 are divisible by 4, and $9+2=11$ has no further common factor. Check: $4\times11=44$ and $36+8=44$.



Question type	Use the	Example
Split into equal groups with nothing left over	GCF	36 apples and 60 oranges make 12 baskets
When two cycles meet again	LCM	Every 8 and 12 minutes: 24 minutes

Greatest Common Factor and Least Common Multiple: frequently asked questions

What is the difference between a factor and a multiple?

A factor divides a number evenly and is no larger than it, such as 4 for 12. A multiple is the product of the number and a whole number, such as 24 for 12, and is never smaller than it.

Is 1 a prime number?

No. A prime number has exactly two different factors, 1 and itself, and 1 has only one factor. The smallest prime number is 2.

When should I use the GCF and when the LCM?

Use the GCF to split things into the largest equal groups with nothing left over. Use the LCM to find when repeating events line up again.

Can the GCF of two numbers be 1?

Yes. Numbers whose only common factor is 1 are called relatively prime, such as 8 and 15. The LCM of two such numbers is their product.

How do you factor a sum with the distributive property?

Find the GCF of the two addends, divide each addend by it, and write the GCF times the sum of the quotients. For example, $54+36=18(3+2)$.