

Lesson 3-4

Prime Factorization, LCM and ^{GCF}~~GCM~~

Multiple	The product of a number and any nonzero whole number.	$6 \times 1 = 6$ $6 \times 4 = 24$ $6 \times 2 = 12$ $6 \times 5 = 30$ $6 \times 3 = 18$
Least Common Multiple (LCM)	<p>"Smallest same #"</p> <p>The least multiple that is common to two or more numbers.</p>	<p>2 and 10</p> <p>2: 2, 4, 6, 8, 10, 12...</p> <p>10: 10, 20, 30...</p>

Example) Find the LCM of 6 and 9.

6: 6, 12, 18, 24, 30...

9: 9, 18, 27...

Step 1: List the multiples of each number.

Step 2: Find the smallest multiple that both numbers have in common. This is the LCM.

You Try! Find the LCM of each pair of numbers.

4, 10

4:

10:

2, 4, 6

2: 2, 4, 6, 8, 10, 12

4: 4, 8, 12

6: 6, 12

5, 7

Factor: A whole number that divides another whole number with a remainder of 0.

In your own words...

Factor	$\begin{array}{cc} & \underline{12} \\ 4 \times 3 & 3 \times 4 \\ 12 \times 1 & 1 \times 12 \\ 6 \times 2 & 2 \times 6 \end{array}$	The factors of 12 are: 1, 2, 3, 4, 6 and 12
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Example) List the factors of 30.

$$\begin{array}{cc} 1 \times 30 & 30 \times 1 \\ 2 \times 15 & 15 \times 2 \\ 3 \times 10 & 10 \times 3 \\ 5 \times 6 & 6 \times 5 \end{array}$$

The factors of 30 are: 1, 2, 3, 5, 6, 10, 15, 30

List the positive factors of each integer.

a) 10

$$\begin{array}{cc} 1 \times 10 & 1, 2, 5, 10 \\ 2 \times 5 & \end{array}$$

b) 21

$$\begin{array}{cc} 1 \times 21 & 1, 3, 7, 21 \\ 3 \times 7 & \end{array}$$

c) 31

$$1 \times 31 \quad 1, 31 \quad \text{*prime number}$$

Composite Number	A whole number greater than 1 that has more than two factors.	12 24 8 100
Prime Number	A whole number with exactly two factors, q and the number itself.	31 11 17 13 2

Circle the prime numbers below.

12

2

14

15

11

13

Prime Factorization

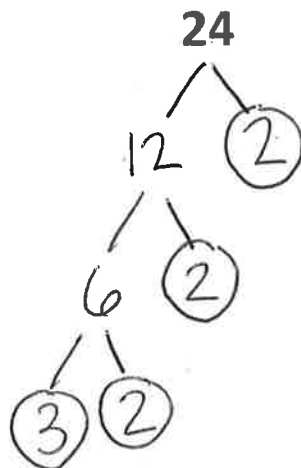
Every human has a unique fingerprint. Similarly, every COMPOSITE number has a unique "factorprint" called prime factorization.

Prime Factorization is the factorization of a composite number into prime factors.



You can use a factor tree to find the prime factorization of any composite number.

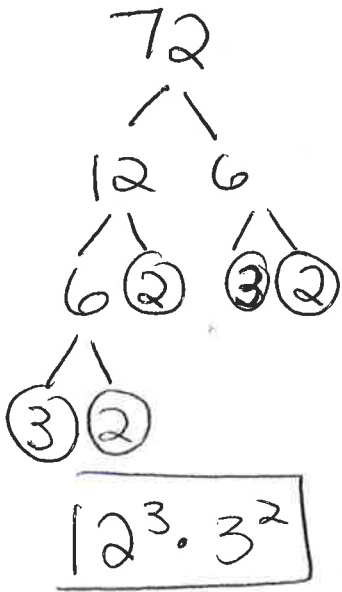
Example:



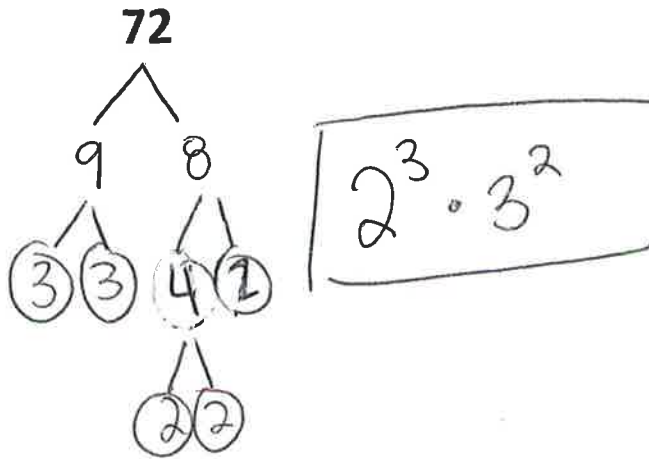
$$3 \cdot 2 \cdot 2 \cdot 2$$

$3 \cdot 2^3$

You Try! Write the prime factorization for 72.



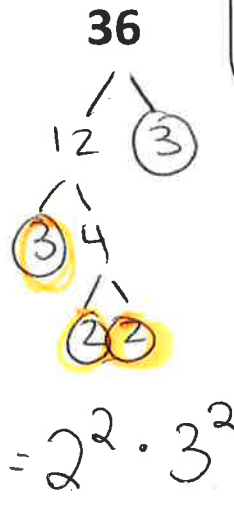
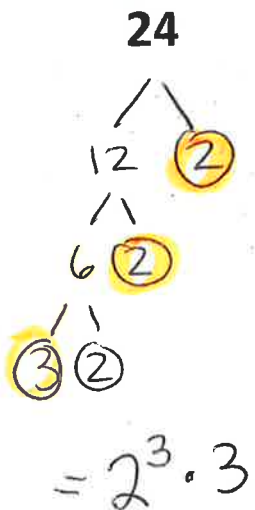
OR



We can use prime factorization to find the Greatest Common Factor of given numbers.

Greatest Common Factor (GCF)	The greatest number that is a factor (or can "go into") of all the numbers.
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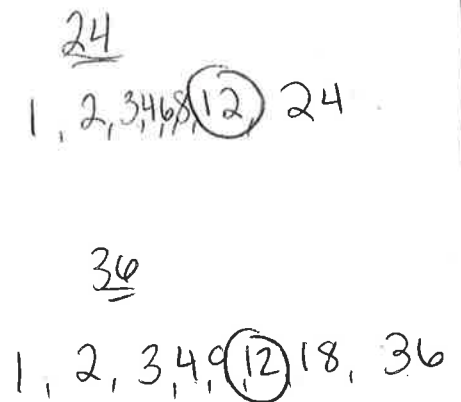
Example) Find the GCF of 24 and 36.



Step 1: Write the prime factorization for each number.

Step 2: Circle the factors that the numbers have in common.

Step 3: Find the product of the common

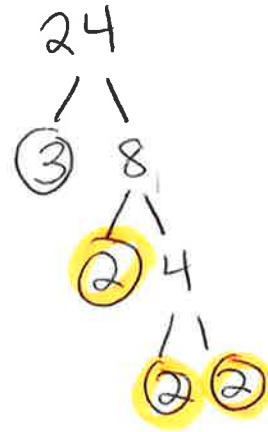
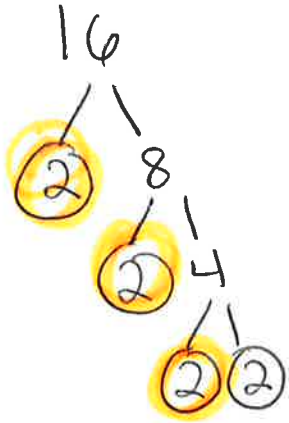


$2 \cdot 2 \cdot 3 = 12$

You Try!

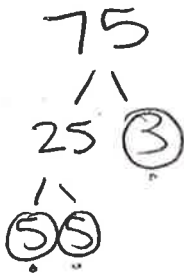
Find the GCF of the pairs of numbers below.

16 and 24



$$\text{GCF} = 2 \cdot 2 \cdot 2 = \boxed{8}$$

75 and 90



$$\text{GCF} = 5 \cdot 3 = \boxed{15}$$

10 and 85



$$\text{GCF} = \boxed{5}$$

