

FACTORS, MULTIPLES, & DIVISIBILITY RULES

PRAXIS FLASHCARD #3

DIVISIBILITY RULES

Knowing the divisibility rules is not critical to your knowledge of teaching elementary school; however, the divisibility rules will make it easier for you to find factors, GCF, LCM, and LCD.

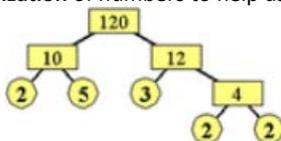
- 2 = Even numbers (ending in 0, 2, 4, 6, and 8)
- 3 = If repeated sums of the digits result in 3, 6, or 9
- 4 = If the last two digits are divisible by 4
- 5 = If the last digit is 0 or 5
- 6 = If the number is divisible by both 2 and 3
- 8 = If the last three digits are divisible by 8
- 9 = If repeated sums of the digits result in 9
- 10 = If the last digit is 0

PRAXIS FLASHCARD #16

FACTOR

Factors are numbers that divide evenly into other numbers – without a remainder. For example, 5 divides into 40 evenly so 5 is a factor of 40.

We often create a **factor tree** or a **prime factorization** of numbers to help us recognize the factors of a number:

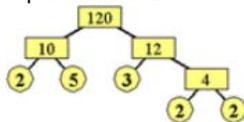


Thus, the prime factorization of $120 = 2 \times 2 \times 2 \times 3 \times 5$

PRAXIS FLASHCARD #17

FACTOR TREE

A **factor tree** is a method used to find a number's **prime factorization**. Start by splitting the number into any two factors that multiply to make that number. Then split each of those two factors into two factors each. Keep splitting each "branch" of the factor tree until you reach a prime number, which cannot be split into factors. The final prime numbers at the end of each "branch" of the factor tree are the prime factorization of the number.

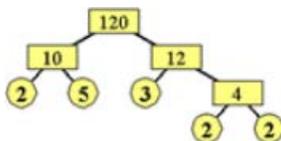


Thus, the prime factorization of $120 = 2 \times 2 \times 2 \times 3 \times 5$

PRAXIS FLASHCARD #18

PRIME FACTORIZATION

A **prime factorization** of a number is a list of all prime factors that multiply together to make that number. A factor tree is often used to find the prime factorization of a number. The prime factorization can be written as the product of individual factors or exponents can be used to write the product of repeated prime factors:



Thus, the prime factorization of $120 = 2 \times 2 \times 2 \times 3 \times 5$

This can also be written as $120 = 2^3 \times 3 \times 5$

PRAXIS FLASHCARD #260

COMMON FACTORS

All counting numbers (except 1) have at least two factors. **Common factors** are those factors that are in common with two or more numbers.

For example,

- The factors of 6 are 1, 2, 3, and 6
- The factors of 9 are 1, 3, and 9
- The common factors of 6 and 9 are 1 and 3

PRAXIS FLASHCARD #19

GCF

The **Greatest Common Factor (GCF)** of two or more numbers is the largest number that is a factor of all the numbers. One way to find the GCF is to write the prime factorization of each of the numbers above each other. Then “bring down” those factors that are in common and multiply them: Find the GCF of 12, 18, 30:

$$\begin{array}{r} 12 = 2 \times 2 \times 3 \\ 18 = 2 \times 3 \times 3 \\ 30 = 2 \times 3 \times 5 \\ \hline \text{GCF} = 2 \times 3 \end{array}$$

The factors common to all three numbers above are 2 and 3. $2 \times 3 = 6$ so 6 is the GCF of 12, 18, and 30.

PRAXIS FLASHCARD #87

MULTIPLES

A **multiple** is the product of any quantity and an integer. Multiples may be found by counting by the number. A **calculator** may be used to find multiples – enter the quantity, hit the plus sign, enter the quantity again, and then hit the equal symbol. Then keep hitting the equal symbol to see successive multiples.

$$23 + 23 = 46, = 69, = 92, = 115, \text{ etc.}$$
$$23 \times 1, 23 \times 2, 23 \times 3, 23 \times 4, 23 \times 5, \text{ etc.}$$

PRAXIS FLASHCARD #261

COMMON MULTIPLES

All counting numbers have an infinite number of multiples. Common multiples are those multiples that are in common with two or more numbers.

For example,

The multiples of 2 are 2, 4, 6, 8, 10, 12, 14, 16, 18, etc.

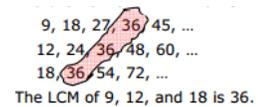
The multiples of 3 are 3, 6, 9, 12, 15, 18, etc.

The common multiples of 2 and 3 are 6, 12, 18, etc.

PRAXIS FLASHCARD #20

LCM

The **Lowest Common Multiple (LCM)** of two or more numbers is the smallest number that is a multiple of all the numbers. One way to find the LCM is to count by each of the numbers and find the first number that is a multiple of all. For example, find the LCM of 9, 12, and 18 →



9, 18, 27, 36, 45, ...
12, 24, 36, 48, 60, ...
18, 36, 54, 72, ...
The LCM of 9, 12, and 18 is 36.

Another way to find the LCM is to write the prime factorization of each of the numbers above each other with the factors all lined up. Then “bring down” one of each factor and multiply them:

$$\begin{array}{r} 9 = 3 \times 3 \\ 12 = 2 \times 2 \times 3 \\ 18 = 2 \times 3 \times 3 \\ \hline \text{LCM} = 2 \times 2 \times 3 \times 3 = 36 \end{array}$$