Whole Numbers and Factoring

Factors are the numbers multiplied together to obtain a product. In the expression, 2 x 3 = 6, the numbers 2 and 3 are factors and the 6 is a product.

Factoring is the process of starting with a number and rewriting it as a product or factors.

Prime numbers are numbers greater than one and have no other factors besides one and themselves. Here is a list of prime numbers less than 30: 2, 3, 5, 7, 11, 13, 17, 19, 23, 29

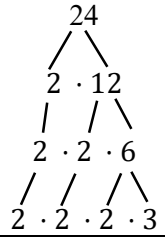
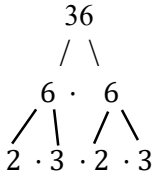
Composite numbers are numbers greater than one and have factors other than one and themselves. For example, 12 has factors of 1, 2, 3, 4, 6, and 12. We can write a variety of multiplication problems to obtain a product of 12.

- 1 x 12 = 12
- 2 x 6 = 12
- 3 x 4 = 12

A prime number, such as 17, only has factors of one and seventeen. We can only write one multiplication problem: 1 x 17 = 17.

Prime factorization has the final step with prime factors. Factor tress are used for prime factorization. Every row of a factor tree has products that multiply together to obtain the number on top.

Example: Use factor trees to factor 24, 19, and 36.

	19 *prime*	

When factoring a prime number completely with a tree, just write "prime".

Note: Bring down **all** prime factors in factor trees. Some books show circled prime factors.

Timetables are very helpful when factoring. For large numbers, there are some basic rules to find factors.

2 is a factor of any even number with a last digit of 0, 2, 4, 6, or 8. The number, 43,246 ends in 6 and thus it has factor of 2.

3 is a factor any number where the digits of the number add up to a sum that has 3 as a factor. For example, the number 417 has 3 as a factor. If you add the digits of 417, 4 + 1 + 7, the sum is 12. 12 has 3 as a factor and thus the original number of 417 has 3 as a factor.

5 is a factor of any number with a last digit of 0 or 5. The number, 48,215, has a factor of 5 since it ends with 5.

10 is a factor of any number with a last digit of 0. The number, 3490, has a factor of 10 since it ends with 10.