Factors and Multiples

TEKS 6.1.D, 6.1.E, 6.1.F

A **prime number** is a whole number that is greater than 1 and has exactly two whole number factors, 1 and itself. A **composite number** is a whole number that is greater than 1 and has more than two whole number factors. The table below shows that the first five prime numbers are 2, 3, 5, 7, and 11.

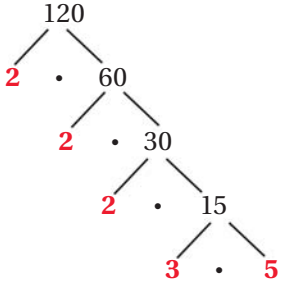
Number	Product(s)	Factor(s)	Prime or composite?
1	$1 \cdot 1$	1	Neither
2	$1 \cdot 2$	1, 2	Prime
3	$1 \cdot 3$	1, 3	Prime
4	$1 \cdot 4, 2 \cdot 2$	1, 2, 4	Composite
5	$1 \cdot 5$	1, 5	Prime
6	$1 \cdot 6, 2 \cdot 3$	1, 2, 3, 6	Composite
7	$1 \cdot 7$	1, 7	Prime
8	$1 \cdot 8, 2 \cdot 4$	1, 2, 4, 8	Composite
9	$1 \cdot 9, 3 \cdot 3$	1, 3, 9	Composite
10	$1 \cdot 10, 2 \cdot 5$	1, 2, 5, 10	Composite
11	$1 \cdot 11$	1, 11	Prime
12	$1 \cdot 12, 2 \cdot 6, 3 \cdot 4$	1, 2, 3, 4, 6, 12	Composite

When you write a composite number as a product of prime numbers, you are writing its **prime factorization**. You can use a **factor tree** to write the prime factorization of a number.

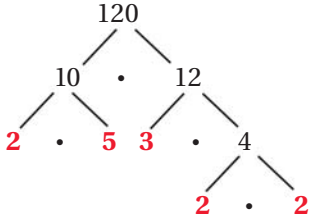
EXAMPLE **Write the prime factorization of 120.**

Write 120 at the top of your factor tree. Draw two branches and write 120 as the product of two factors. Continue to draw branches until all the factors are prime numbers (shown in red). Here are two possible factor trees for 120.

Start with $120 = 2 \cdot 60$.



Start with $120 = 10 \cdot 12$.



Both factor trees show that $120 = 2 \cdot 2 \cdot 2 \cdot 3 \cdot 5$, or $120 = 2^3 \cdot 3 \cdot 5$.

▶ The prime factorization of 120 is $2^3 \cdot 3 \cdot 5$.