

Factor Strings

A **factor string** is a name for a number written as a product of two or more factors. In a factor string, 1 may not be used as a factor.

The **length of a factor string** is equal to the number of factors in the string. The longest factor string for a number is made up of prime numbers. The longest factor string for a number is called the **prime factorization** of that number.

Example

Number	Factor Strings	Length
20	$2 * 10$	2
	$4 * 5$	2
	$2 * 2 * 5$	3

The order of the factors is not important. For example, $2 * 10$ and $10 * 2$ are the same factor string.

The longest factor string for 20 is $2 * 2 * 5$. So the prime factorization of 20 is $2 * 2 * 5$.

1. Find all the factor strings for each number below.

a.

Number	Factor Strings	Length
12		

b.

Number	Factor Strings	Length
16		

c.

Number	Factor Strings	Length
18		

d.

Number	Factor Strings	Length
28		

Factor Strings (cont.)

2. Write the prime factorization (the longest factor string) for each number.

a. $27 =$ _____

b. $40 =$ _____

c. $36 =$ _____

d. $42 =$ _____

e. $48 =$ _____

f. $60 =$ _____

g. $100 =$ _____

An **exponent** is a raised number that shows how many times the number to its left is used as a factor.

Examples $5^2 \leftarrow$ exponent

5^2 means $5 * 5$, which is 25.

5^2 is read as "5 squared" or as "5 to the second power."

$10^3 \leftarrow$ exponent

10^3 means $10 * 10 * 10$, which is 1,000.

10^3 is read as "10 cubed" or as "10 to the third power."

$2^4 \leftarrow$ exponent

2^4 means $2 * 2 * 2 * 2$, which is 16.

2^4 is read as "2 to the fourth power."

3. Write each number as a product of factors. Then find the answer.

Examples $2^3 =$ $2 * 2 * 2$ $=$ 8

$2^2 * 9 =$ $2 * 2 * 9$ $=$ 36

a. $10^4 =$ _____ $=$ _____

b. $3^2 * 5 =$ _____ $=$ _____

c. $2^4 * 10^2 =$ _____ $=$ _____

4. Rewrite each product using exponents.

Examples $5 * 5 * 5 =$ 5^3 $5 * 5 * 3 * 3 =$ $5^2 * 3^2$

a. $3 * 3 * 3 * 3 =$ _____

b. $4 * 7 * 7 =$ _____

c. $2 * 5 * 5 * 7 =$ _____

d. $2 * 2 * 2 * 5 * 5 =$ _____