

Chapter 6 Lesson 1

Powers and Exponents

Product of **LIKE** factors can be written in exponential form using an exponent and a base.

Base: is the number used as a FACTOR.

Exponent: tells how many times a base is used as a factor.

$$\begin{array}{c} \boxed{10} \times \boxed{10} = \boxed{10}^{24} \end{array}$$

Diagram illustrating the components of the equation $10 \times 10 = 10^{24}$:

- The **factors** are the two 10s being multiplied.
- The **base** is the 10 that remains after simplification.
- The **exponent** is the 24, which indicates how many times the base is used as a factor.

Powers: numbers expressed using exponents.

$$5^2 \text{ five squared } 5 \times 5 = 25$$

$$6^3 \text{ six cubed } 6 \times 6 \times 6 = 216$$

$$2^5 \text{ two to the fifth power } 2 \times 2 \times 2 \times 2 \times 2 = 32$$

Examples:

Write 7^3 as a product of the same factor. Then find the value.

$$7 \times 7 \times 7$$

$$343$$

$$7 \times 7 = 49$$

$$\begin{array}{r} 49 \\ \times 7 \\ \hline 343 \end{array}$$

Write 2.5^2 as a product of the same factor. Then find the value.

$$2.5 \times 2.5$$
$$625$$

$$\begin{array}{r} 2.5 \\ \times 2.5 \\ \hline 125 \\ + 500 \\ \hline 625 \end{array}$$

Write $(1/3)^3$ as a product of the same factor. Then find the value.

$$\frac{1}{3} \times \frac{1}{3} \times \frac{1}{3}$$
$$\frac{1}{27}$$

$$\frac{1}{3} \times \frac{1}{3} \times \frac{1}{3} = \frac{1}{27}$$

Write each product using an exponent.

$$7 \times 7 \times 7 = 7^3$$

$$1.3 \times 1.3 \times 1.3 \times 1.3 = 1.3^4$$

$$\frac{1}{4} \times \frac{1}{4} \times \frac{1}{4} \times \frac{1}{4} = \left(\frac{1}{4}\right)^4$$