

Exponents

An **exponent** shows how many times a **base number** occurs as a factor. This is sometimes referred to as repeated multiplication.

When working with exponents, remember the following rules:

1. Any base number (except zero) with zero as the exponent equals 1.

$$5^0 = 1 \quad 10^0 = 1 \quad 25,000,000^0 = 1$$

2. Any base number with 1 as the exponent equals the base number.

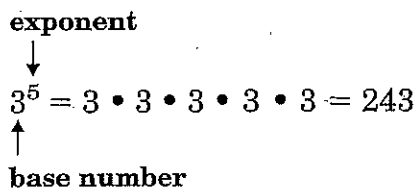
$$5^1 = 5 \quad 10^1 = 10 \quad 25,000,000^1 = 25,000,000$$

Example



Evaluate: 3^5

The exponent (⁵) shows that the base number (3) occurs as a factor 5 times.



$$3^5 = 243$$

Example



Evaluate: 5^4

$$5^4 = 5 \cdot 5 \cdot 5 \cdot 5 = 625$$

$$5^4 = 625.$$



TIP: Exponents are called **powers** when you read them. 6^4 is read "six to the fourth power." An exponent of 2 can be read as "to the second power" or "squared," and an exponent of 3 can be read as "to the third power" or "cubed."

≡ PRACTICE

Directions: For Numbers 1 through 7, write the expression as the factors of the base number and then evaluate.

1. $9^3 =$ _____ $=$ _____

2. $15^0 =$ _____ $=$ _____

3. $10^2 =$ _____ $=$ _____

4. $6^4 =$ _____ $=$ _____

5. $12^1 =$ _____ $=$ _____

6. $2^7 =$ _____ $=$ _____

7. $4^5 =$ _____ $=$ _____

Directions: For Numbers 8 through 12, write each expression using exponents.

8. $3 \cdot 3 \cdot 3 \cdot 3 \cdot 3 =$ _____

9. $7 \cdot 7 =$ _____

10. $5 \cdot 5 \cdot 5 \cdot 5 \cdot 5 \cdot 5 \cdot 5 =$ _____

11. $8 \cdot 8 \cdot 8 \cdot 8 =$ _____

12. $10 \cdot 10 \cdot 10 \cdot 10 \cdot 10 \cdot 10 =$ _____