

Exponents

base \longrightarrow 3^5 \longleftarrow exponent

The number 3 is the **base**.
It is the factor that is multiplied.

The number 5 is the **exponent**.
It tells how many times the base is used as a factor.

3^5 is read "three to the fifth power."

$3^5 = 3 \times 3 \times 3 \times 3 \times 3$ \longrightarrow Five factors of 3
are multiplied.

How to write a power as a product
and then evaluate:

$$2^4$$

The base (2) is used as a factor
the number of times as shown by
the exponent (4):

$$2^4 = 2 \times 2 \times 2 \times 2 = 16$$

How to write a product in
exponential form:

$$5 \times 5 \times 5$$

Step 1: Write the base.

$$5$$

Step 2: Count the number of
times the base is used
as a factor. This is the
exponent.

$$5^3$$

How to use exponents to write a number in
expanded form:

$$4,512 = (4 \times 1,000) + (5 \times 100) + (1 \times 10) + (2 \times 1) \\ = (4 \times 10^3) + (5 \times 10^2) + (1 \times 10^1) + (2 \times 10^0)$$

Write each power as a product and then evaluate.

1. 5^3 _____

2. 2^5 _____

3. 7^3 _____

Write each product in exponential form.

4. $8 \times 8 \times 8$ _____

5. $20 \cdot 20 \cdot 20 \cdot 20$ _____

Write the number in expanded form using exponents.

6. $1,324 = (1 \times 10^3) + (3 \times 10^2) + (\text{_____}) + (\text{_____})$

7. **Number Sense** Are 2^4 and 4^2 equal? Explain why or why not.

Exponents

Write each power as a product and then evaluate.

1. 3^2

2. 8^3

3. 5^3

4. 10^3

5. 3^5

6. 4 squared

7. **Reasoning** Is 4×2 equal to 4^2 ? Explain why or why not.

Write each product in exponential form.

8. 35 squared

9. $12 \times 12 \times 12 \times 12$

10. $28 \times 28 \times 28 \times 28 \times 28$

11. 22 cubed

12. Some computer virus programs are based on exponents. A certain program could begin with 4 screens. When it has been cubed, how many screens will be affected?

13. Write $2 \times 2 \times 2 \times 2 \times 2$ in exponential form and as a product in standard form.

Test Prep

14. Which shows 5 squared in exponential form?

A. 10

B. 25

C. 5^2

D. 5×5

15. **Writing in Math** Zach began with \$10 in investments and was able to “triple” his money. Alli also began with \$10. She was able to “cube” her money. Who ended up with more money? Explain.
