

1-2 Study Guide and Intervention**Powers and Exponents**

$$\begin{array}{c}
 \text{Exponent} \\
 \swarrow \\
 3^4 = \underbrace{3 \cdot 3 \cdot 3 \cdot 3}_{\text{common factors}} = 81 \\
 \uparrow \\
 \text{Base}
 \end{array}$$

The **exponent** tells you how many times the **base** is used as a factor.

Example 1 Write 6^3 as a product of the same factor.

The base is 6. The exponent 3 means that 6 is used as a factor 3 times.

$$6^3 = 6 \cdot 6 \cdot 6$$

Example 2 Evaluate 5^4 .

$$\begin{aligned}
 5^4 &= 5 \cdot 5 \cdot 5 \cdot 5 \\
 &= 625
 \end{aligned}$$

Example 3 Write $4 \cdot 4 \cdot 4 \cdot 4 \cdot 4$ in exponential form.

The base is 4. It is used as a factor 5 times, so the exponent is 5.

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

Exercises

Write each power as a product of the same factor.

- | | | | |
|---------------------------------|---|-------------------------|--|
| 1. 7^3
$7 \cdot 7 \cdot 7$ | 2. 2^7
$2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$ | 3. 9^2
$9 \cdot 9$ | 4. 15^4
$15 \cdot 15 \cdot 15 \cdot 15$ |
|---------------------------------|---|-------------------------|--|

Evaluate each expression.

- | | | | |
|-----------------|-----------------|-------------------|-----------------|
| 5. 3^5
243 | 6. 7^3
343 | 7. 8^4
4,096 | 8. 5^3
125 |
|-----------------|-----------------|-------------------|-----------------|

Write each product in exponential form.

- | | |
|--|--|
| 9. $2 \cdot 2 \cdot 2 \cdot 2$
2^4 | 10. $7 \cdot 7 \cdot 7 \cdot 7 \cdot 7 \cdot 7$
7^6 |
| 11. $10 \cdot 10 \cdot 10$
10^3 | 12. $9 \cdot 9 \cdot 9 \cdot 9 \cdot 9$
9^5 |
| 13. $12 \cdot 12 \cdot 12$
12^3 | 14. $5 \cdot 5 \cdot 5 \cdot 5$
5^4 |
| 15. $6 \cdot 6 \cdot 6 \cdot 6 \cdot 6$
6^5 | 16. $1 \cdot 1 \cdot 1 \cdot 1 \cdot 1 \cdot 1 \cdot 1 \cdot 1 \cdot 1$
1^8 |