



What is true about the factors of a number written in exponential notation? [All of the factors are the same.]

Numbers involving exponents can be written in three different forms.

Exponential notation

Expanded form

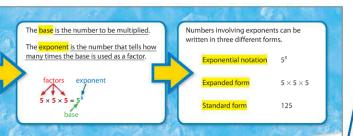
Standard form 125

 $5 \times 5 \times 5$

When might you want to use exponential notation rather than expanded form? [Use exponential notation when the exponent is large. It can be faster than writing out the repeated multiplication in expanded form.

Prevent Misconceptions

Some students may wrongly multiply the base by the exponent to find the standard form of a number written in exponential notation. Encourage students to write the number in expanded form first and then in standard form to avoid this error.



Independent Practice

In 8 through 14, write in exponential notation.

- 8. 10 × 10 × 10 × 10 × 10 105 **12.** 7 × 7 × 7
- 9. $9 \times 9 \times 9$
- 10. 81 × 81 81² 11. $5 \times 5 \times 5 \times 5$ 5^4 13. $13 \times 13 \times 13 \times 13 \times 13 \times 13$ 14. $6 \times 6 \times 6 \times 6$
- In 15 through 22, write in expanded form.

In 23 through 30 write in standard form.

15. 17⁵ See margin. **19.** 55⁴ See marain

23. 5⁴

27. 1¹⁰

625

16. 35 squared 35 × 35 20. 11⁶

24. 10³

28. 2⁶

1000

- $4 \times 4 \times 4$
 - 21. 8 cubed

 - **22.** 1⁹
 - **25.** $4 \times 4 \times 4$ 64 29. 3 cubed
- **26.** 12 squared 144
- **30.** 9⁴
- 31. Writing to Explain Why is the standard form of 82 NOT equal to 16? $8^2 = 8 \times 8$ which is 64, not 16.
- 33. Darnell earned \$10 each week for 10 weeks walking a neighbor's dog.
 - a How much did he earn? b Write the amount Darnell earned using exponential notation.
- 32. Number Sense Find the number that equals 81 when it is squared.
- 34. Which of the following, when written in standard form, is equal to the standard form of 26?
 - $A 6^2$ (C) 8² D 44
 - B 34

Lesson 3-7



- 15. $17 \times 17 \times 17 \times 17 \times 17$
- 18. $7 \times 7 \times 7 \times 7 \times 7 \times 7$
- 19. $55 \times 55 \times 55 \times 55$
- 20. $11 \times 11 \times 11 \times 11 \times 11 \times 11$
- 22. $1 \times 1 \times 1$

Independent Practice

Remind students that a base is the number to be multiplied, and the exponent is the number that tells how many times the base is used as a factor. Use Exercise 9 as an example. What is the base? [9] What is the exponent? [3] So how many times is the base used as a factor? [3 times]

Problem Solving

| Exercise | Content |
|----------|---------------------------------------|
| 31 | Communicate Math Understanding |
| | Meaning of Exponential Notation |
| 32 | Square Numbers |
| 33a | Multiplication (10 × 10) |
| 33b | Write Numbers in Exponential Notation |
| 34 | Write Numbers in Standard Form |

Students use underlying processes and mathematical tools for Exercises 31-34. Remind students to check for reasonableness when solving each problem.

Exercise 31

Explain to students that an exponent is also called a power. 8 raised to the fourth power means 84. How many times is 8 used as a factor? [4 times]

Exercise 34

Test-Taking Tip: Make Smart Choices Encourage students to eliminate wrong answers. What is the standard form of 2°? [64] What answers can you eliminate based on this information? [Choices A, B, and D]