

Reteaching 3-1

Exponents and Order of Operations

You can use a shortcut to indicate repeated multiplication. The **exponent** tells how many times the **base** is used as a factor.

$$5 \times 5 \times 5 \times 5 = 5^4 = 625$$

↙ exponent
↑ base

5^4 is called an **exponential expression** and 625 is the **value of the expression**.

You can use this sentence \longrightarrow **Please Excuse My Dear Aunt Sally.** to remember the order of operations for expressions with exponents.

$$\begin{aligned} 2^2 + 4(7 - 3) + 6 &= 2^2 + 4(4) + 6 \\ &= 4 + 4(4) + 6 \\ &= 4 + 16 + 6 \\ &= 26 \end{aligned}$$

- P** Do all operations within **P**arentheses first.
- E** Evaluate any terms with **E**xponents.
- M-D** **M**ultiply and **D**ivide in order from left to right.
- A-S** **A**dd and **S**ubtract in order from left to right.

Write each expression using exponents.

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|--|---|
| 1. $6 \times 6 \times 6 \times 6 \times 6$ _____ | 2. $0.2 \times 0.2 \times 0.2$ _____ |
| 3. $9 \times 9 \times 9 \times 9$ _____ | 4. $12 \times 12 \times 12 \times 12 \times 12$ _____ |

Write each expression as a product of its factors. Then evaluate each expression.

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|-----------------------|----------------------|
| 5. 12^2 _____ | 6. 8^3 _____ |
| 7. $(0.4)^3$ _____ | 8. 5^5 _____ |
| 9. 3^6 _____ | 10. 1.4^2 _____ |

Simplify each expression.

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|----------------------------------|--------------------------|----------------------------------|---------------------------------------|
| 11. $7^2 + 3^3$ _____ | 12. $8 + 4^2$ _____ | 13. $5(0.2 + 0.8)^{10}$ _____ | 14. $(9 - 7)^2$ _____ |
| 15. $(8^2 + 16) \div 2$ _____ | 16. $5^3 + 100$ _____ | 17. $(4 + 7)^2 - 8$ _____ | 18. $(9 - 3)^2 + 6 \times 2$ _____ |