Exponents and Order of Operations

Exponents and order of operations: Mistakes and missing information

Name _____ **Date** _____ **Score** _____ / 8

QUICK REVIEW

An exponent counts equal factors: $3^4 = 3 \times 3 \times 3 \times 3 = 81$, not 3×4. Evaluate grouping symbols, then exponents, then multiplication/division left to right, then addition/subtraction left to right. Thus $2 + 3^2 \times 4 = 2 + 9 \times 4 = 38$.

Worked example

Evaluate $5 + 2^3 \times 3$.

1. $2^3 = 2 \times 2 \times 2 = 8$.

2. $5 + 8 \times 3 = 5 + 24 = 29$.

Answer: 29.

Practice Problems

Show your thinking.

1. A student says $5^2 = 10$. Correct it.

2. A student gets 49 for $3 + 4^2$. Correct the order.

3. Find the missing whole-number exponent: $2^{\square} = 32$.

4. Correct $24 \div 6 \div 2 = 8$.

5. Find the missing nonnegative base: $\square^2 = 49$.

6. Evaluate $4(7 - 3)^2$ to test the claim 64.

7. Correct $2^5 = 10$.

8. Find the missing nonnegative base in $\square^3 = 64$.

Answer Key

1. 25.
2. 19.
3. 5.
4. 2.
5. 7.
6. 64.
7. 32.
8. 4.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. 5^2 means 5×5, not 5×2.
2. $5 \times 5 = 25$.

Problem 2

1. $4^2 = 16$ before addition.
2. $3 + 16 = 19$; 49 would be $(3 + 4)^2$.

Problem 3

1. $2^4 = 16$.
2. $2^5 = 2 \times 16 = 32$, so the exponent is 5.

Problem 4

1. Left to right: $24/6 = 4$.
2. $4/2 = 2$, whereas $24/(6/2) = 8$ groups incorrectly.

Problem 5

1. $6^2 = 36$ and $8^2 = 64$.
2. $7^2 = 7 \times 7 = 49$, so the base is 7.

Problem 6

1. $7 - 3 = 4$; $4^2 = 16$.
2. $4 \times 16 = 64$, so the claim is correct.

Problem 7

1. $2^5 = 2 \times 2 \times 2 \times 2 \times 2$.
2. $16 \times 2 = 32$, not $2 \times 5 = 10$.

Problem 8

1. $3^3 = 27$ and $5^3 = 125$.
2. $4^3 = 4 \times 4 \times 4 = 64$, so the base is 4.

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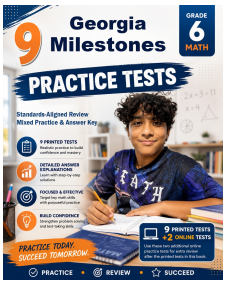

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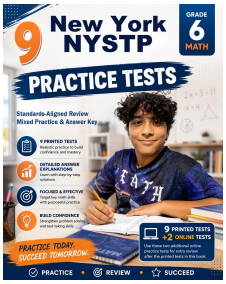

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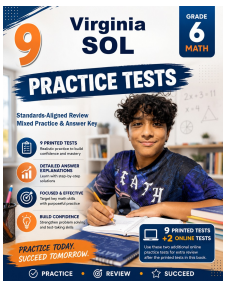

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