Exponents and Order of Operations

Exponents and order of operations: Applications and decisions

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 display has 3 layers of 4^2 tiles plus 5 spare tiles. Find total tiles.

2. A square garden has side 6 m and loses 8 square m to a path. Evaluate $6^2 - 8$.

3. Pack 48 balls equally into 2^3 boxes. Find balls per box.

4. A game score is $10 + 2 \times 3^2$. A student says 108. Correct it.

5. A square tile array has 81 tiles. Find its nonnegative whole-number side length.

6. A 5-cm cube is compared with 5 separate 1-cubic-cm blocks. Find the cube volume to explain the difference.

7. A display has 2 square layers of side 5 tiles and 4 extras. Find total tiles.

8. Explain and evaluate the number of small squares in 3 arrays, each 4 by 4.

Answer Key

1. 53.
2. 28.
3. 6.
4. 28.
5. 9.
6. 125.
7. 54.
8. 48.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. Each layer has $4^2 = 16$ tiles; $3 \times 16 = 48$.
2. Total $= 48 + 5 = 53$ tiles.

Problem 2

1. Square area $= 6^2 = 36$ m^2.
2. Planting area $= 36 - 8 = 28$ m^2.

Problem 3

1. $2^3 = 8$ boxes.
2. $48/8 = 6$ balls per box.

Problem 4

1. $3^2 = 9$ and $2 \times 9 = 18$.
2. $10 + 18 = 28$ points, not 108.

Problem 5

1. $8^2 = 64$ and $10^2 = 100$.
2. $9^2 = 81$, so each side has 9 tiles.

Problem 6

1. $5^3 = 5 \times 5 \times 5 = 125$ cm^3.
2. $125 - 5 = 120$ cm^3 more than the five unit blocks.

Problem 7

1. Two layers use $2 \times 5^2 = 2 \times 25 = 50$ tiles.
2. Add extras: $50 + 4 = 54$ tiles.

Problem 8

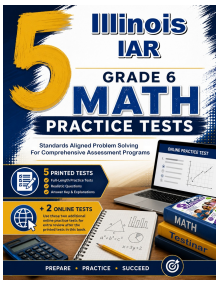
1. Each array contains $4^2 = 4 \times 4 = 16$ squares.
2. Three arrays contain $3 \times 16 = 48$ squares.

TESTINAR

Keep Building Grade 6 Math Skills

Choose the practice book matched to your state assessment and turn worksheet practice into a complete test-prep plan.

All Grade 6 books



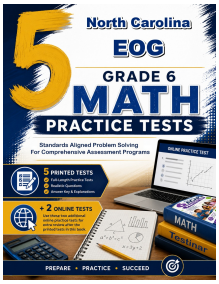
ILLINOIS IAR

5 Full-Length Math Practice Tests

Build Grade 6 accuracy, confidence, and test stamina with 5 printable practice tests.

Printable eBook • Instant PDF access

View eBook



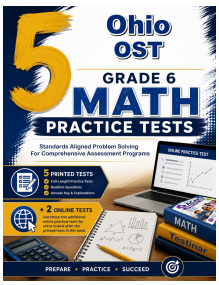
NORTH CAROLINA EOG

5 Full-Length Math Practice Tests

Build Grade 6 accuracy, confidence, and test stamina with 5 printable practice tests.

Printable eBook • Instant PDF access

View eBook



OHIO OST

5 Full-Length Math Practice Tests

Build Grade 6 accuracy, confidence, and test stamina with 5 printable practice tests.

Printable eBook • Instant PDF access

View eBook

Need a different state?
Testinar has Grade 6 math practice books for state assessments across the country.

TESTINAR.COM/GRADES/6