

Grade 6 · Exponents and Order of Operations · Worksheet Answer Key

Common Core 6.EE.A.1, 6.EE.A.2c · mathovore.fr

This answer key gives a full worked solution for each of the 20 problems on the exponents and order of operations worksheet. Every step shows which operation is done first, and every final answer is in bold so it is easy to check.

Grade 6 Common Core: 6.EE.A.1 · 6.EE.A.2c

Problem 1: Writing Products as Powers

- a. Three factors of 5: 5^3 . Answer: 5^3
- b. Five factors of 7: 7^5
- c. Two factors of 9: 9^2
- d. Six factors of 2: 2^6

Problem 2: Base and Exponent

The base is the number that is multiplied. The exponent tells how many times the base is used as a factor.

- a. Base 6, exponent 3: $6 \times 6 \times 6$
- b. Base 9, exponent 4: $9 \times 9 \times 9 \times 9$
- c. Base 12, exponent 2: 12×12

Problem 3: Evaluating Powers

- a. $3^4 = 3 \times 3 \times 3 \times 3 = 9 \times 9 = 81$
- b. $2^6 = 4 \times 4 \times 4 = 16 \times 4 = 64$
- c. $5^3 = 25 \times 5 = 125$
- d. $8^2 = 8 \times 8 = 64$

Problem 4: Squares, Cubes, and More

- a. $11^2 = 11 \times 11 = 121$
- b. $6^3 = 6 \times 6 \times 6 = 36 \times 6 = 216$
- c. $2^4 = 16$, so $2^8 = 16 \times 16 = 256$
- d. $7^3 = 49 \times 7 = 343$

Problem 5: Powers of 10

- a. 100,000 has five zeros after the 1: 10^5
- b. 10,000,000 has seven zeros: 10^7
- c. 10^4 is a 1 followed by four zeros: **10,000**
- d. 10^6 is a 1 followed by six zeros: **1,000,000**

Problem 6: Powers of 10 in Two Forms

- a. 1,000,000,000 has nine zeros after the 1: 10^9
- b. 10^5 is a 1 followed by five zeros: 100,000
- c. Seven factors of 10: $10^7 = 10,000,000$
- d. The number of zeros equals the exponent: **8 zeros**

Problem 7: Order of Operations Without Exponents

- a. Multiply first: $4 \times 3 = 12$. Then $5 + 12 = 17$
- b. Multiply first: $4 \times 5 = 20$. Then $30 - 20 = 10$
- c. Left to right: $24 \div 4 = 6$, then $6 \times 3 = 18$
- d. Divide first: $6 \div 3 = 2$. Then $18 - 2 + 2 = 16 + 2 = 18$

Problem 8: Left to Right Practice

- a. Left to right: $45 - 12 = 33$. Then $33 + 8 = 41$
- b. Left to right: $8 \times 6 = 48$. Then $48 \div 4 = 12$
- c. Left to right: $56 \div 7 = 8$. Then $8 \times 3 = 24$
- d. Divide, then multiply: $18 \div 3 = 6$, $6 \times 2 = 12$. Then $20 - 12 = 8$

Problem 9: Grouping Symbols

- a. Parentheses: $9 + 3 = 12$. Then $12 \times 2 = 24$
- b. Parentheses: $2 + 3 = 5$. Then $40 \div 5 = 8$
- c. Parentheses: $12 - 7 = 5$. Then $5 \times 5 = 25$
- d. Parentheses: $3 \times 2 = 6$. Then $36 \div 6 = 6$ and $6 + 1 = 7$

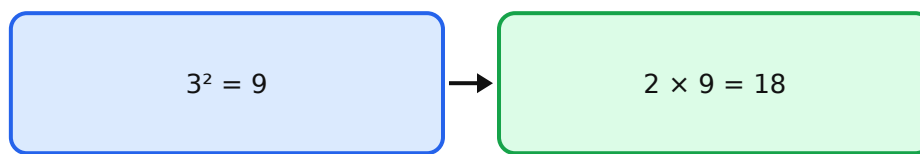
Problem 10: Nested Grouping Symbols

- a. $14 - 6 = 8$ and $3 + 2 = 5$. Then $8 \times 5 = 40$
- b. $4 \times 3 = 12$. Then $72 \div 12 = 6$
- c. $18 - 9 = 9$. Divide: $9 \div 3 = 3$. Add: $5 + 3 = 8$
- d. Innermost: $10 - 4 = 6$. Next: $3 + 6 = 9$. Then $2 \times 9 = 18$

Problem 11: Exponents in Expressions

- a. Exponent first: $3^2 = 9$. Then $2 \times 9 = 18$

- b. Parentheses: $2 \times 3 = 6$. Then $6^2 = 36$
- c. Exponent first: $4^2 = 16$. Then $50 - 16 = 34$
- d. Exponents: $5^2 = 25$ and $3^3 = 27$. Then $25 + 27 = 52$



Square first, then multiply.

Problem 12: Squares in Expressions

- a. $4^2 = 16$ and $3^2 = 9$. Then $16 + 9 = 25$
- b. $10^2 = 100$ and $6^2 = 36$. Then $100 - 36 = 64$
- c. Exponent: $5^2 = 25$. Multiply: $2 \times 25 = 50$. Then $50 - 8 = 42$
- d. Parentheses: $10 - 4 = 6$. Exponent: $6^2 = 36$. Then $36 \div 3 = 12$

Problem 13: Mixed Expressions

- a. $2^3 = 8$. Then $8 \times 4 = 32$. Then $6 + 32 - 10 = 38 - 10 = 28$
- b. $5^2 = 25$. Then $100 \div 25 = 4$. Then $4 + 7 = 11$
- c. Parentheses: $4 + 2 = 6$. Exponent: $6^2 = 36$. Then $3 \times 36 = 108$
- d. Exponent: $2^2 = 4$. Parentheses: $20 - 4 = 16$. Then $16 \div 4 = 4$

Problem 14: Exponent Challenge

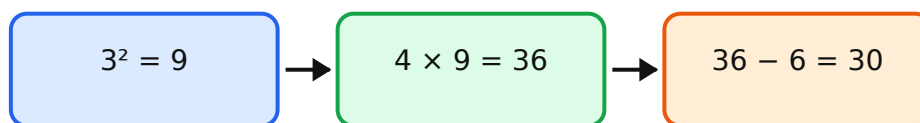
- a. $3^2 = 9$ and $2^3 = 8$. Then $9 \times 8 = 72$
- b. Exponent: $4^2 = 16$. Multiply: $2 \times 16 = 32$. Then $100 - 32 = 68$
- c. Parentheses: $9 - 5 = 4$. Exponent: $4^3 = 64$. Then $64 \div 8 = 8$
- d. Exponent: $3^2 = 9$. Left to right: $18 \div 9 = 2$, then $2 \times 5 = 10$. Then $6 + 10 = 16$

Problem 15: School Store Folders

Nine folders cost 4×3^2 dollars. The coupon takes off \$6, so the expression is $4 \times 3^2 - 6$.

Exponent: $3^2 = 9$. Multiply: $4 \times 9 = 36$. Subtract: $36 - 6 = 30$.

Jamal pays \$30.

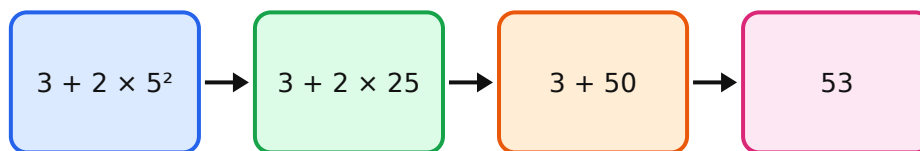


Exponent, then multiply, then subtract.

Problem 16: Finding an Error

Maya added $3+2=5$ first and then computed $5 \times 5^2 = 5 \times 25 = 125$. Exponents and multiplication come before addition.

Exponent: $5^2 = 25$. Multiplication: $2 \times 25 = 50$. Addition: $3 + 50 = 53$. Correct value: 53

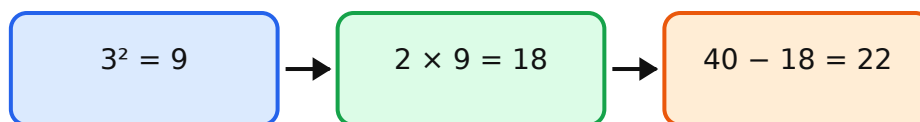


Correct order for Maya's expression.

Problem 17: Another Error to Fix

Liam subtracted first: $40 - 2 = 38$, then multiplied $38 \times 3^2 = 38 \times 9 = 342$. Exponents and multiplication come before subtraction.

Exponent: $3^2 = 9$. Multiply: $2 \times 9 = 18$. Subtract: $40 - 18 = 22$. Correct value: 22



Correct order for Liam's expression.

Problem 18: Patio Cost

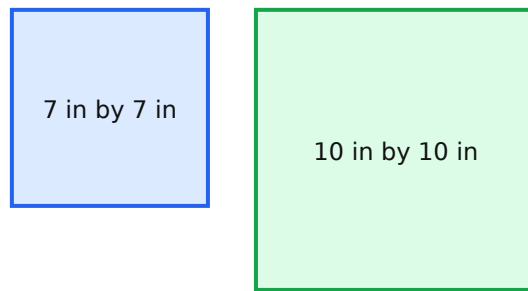
The area is 8^2 square feet, and paving costs \$3 per square foot, so the paving costs 3×8^2 . Add the \$10 delivery fee: $3 \times 8^2 + 10$.

Exponent: $8^2 = 64$. Multiply: $3 \times 64 = 192$. Add: $192 + 10 = 202$.

Total cost: \$202

Problem 19: Picture Frames

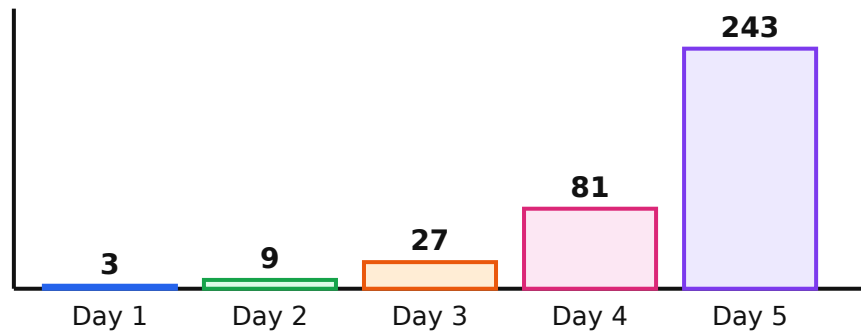
- a. $7^2 = 7 \times 7 = 49$ and $10^2 = 100$. 49 sq in **and** 100 sq in
- b. $10^2 - 7^2 = 100 - 49 = 51$. 51 sq in **more**
- c. $7^2 + 10^2 = 49 + 100 = 149$. 149 sq in



Areas: 49 sq in and 100 sq in.

Problem 20: Chain Message

- a. Day 4: $3^4 = 3 \times 3 \times 3 \times 3 = 81$. Answer: **$3^4 = 81$ people**
- b. Day 5: $3^5 = 81 \times 3 = 243$. Answer: **243 people**
- c. $3^5 - 3^4 = 243 - 81 = 162$. Answer: **162 more people**



Day 5 has 243, which is 162 more than day 4.