

0.1 Order of Operations

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Order of Operations

Chapter 0 — Absolute Foundations

Show all work. Rewrite subtraction as “add the opposite” when helpful. Use parentheses to keep your steps organized.

Name: _____ Date: _____

Key Idea — Order of Operations (PEMDAS)

Always do operations in this order:

1. Parentheses (grouping symbols)
2. Exponents
3. Multiplication and Division *from left to right*
4. Addition and Subtraction *from left to right*

Important: Multiplication and division are a *pair* (same priority). Addition and subtraction are a *pair* (same priority).

Common Mistakes to Avoid

- Doing addition before multiplication. Example: $3 + 2 \cdot 5$ is $3 + 10 = 13$, not $(3 + 2) \cdot 5$.
- Forgetting left-to-right for \div and \times . Example: $24 \div 3 \cdot 2$ is $(24 \div 3) \cdot 2 = 16$.
- Losing negative signs. Rewrite subtraction as addition: $a - b = a + (-b)$.
- Forgetting parentheses after a minus sign: $-(x - 7) = -x + 7$.

Worked Examples (follow the order)

Example 1. Evaluate: $6 + 3 \cdot 4$

$$6 + 3 \cdot 4 = 6 + 12 = 18.$$

Example 2. Evaluate: $24 \div 3 \cdot 2$

$$24 \div 3 \cdot 2 = (24 \div 3) \cdot 2 = 8 \cdot 2 = 16.$$

Example 3. Evaluate: $-(5 - 12) + 3^2$

$$-(5 - 12) + 3^2 = -(-7) + 9 = 7 + 9 = 16.$$

Example 4. Simplify: $2(3x - (x - 4))$

$$2(3x - (x - 4)) = 2(3x - x + 4) = 2(2x + 4) = 4x + 8.$$

Mini-check. Evaluate: $10 - 2 \cdot (3 + 1) \Rightarrow \underline{\hspace{2cm}}$

Practice A — Evaluate (Warm-Up)

Evaluate.

$$1. \ 8 + 2 \cdot 6$$

$$2. \ 30 - 5 \cdot 4$$

$$3. \ 18 \div 3 + 7$$

$$4. \ 4^2 - 3 \cdot 5$$

$$5. \ 12 \div 2 \cdot 3$$

$$6. \ 36 \div (6 \cdot 3)$$

$$7. \ 7(5 - 2) + 1$$

$$8. \ 9 - (2 + 4)^2$$

Practice B — Parentheses & Negatives

Evaluate.

$$1. \ -(8 - 13) + 6$$

$$2. -3(2 - 7)$$

$$3. 5 - (3 - 9)$$

$$4. 2(4 - (1 - 6))$$

$$5. -2^3 + 10$$

$$6. (-2)^3 + 10$$

Practice C — Simplify (Variables)

Simplify completely.

1. $3x + 2x \cdot 4$

2. $10 - 2(3x + 1)$

3. $4(x + 2) - 3(x - 5)$

4. $2(3x - (x - 7))$

5. $6 - 2(4 - x)$

6. $-(2x - 3) + 5(x - 1)$

Challenge (optional)

Take your time. Organize with parentheses.

1. Evaluate: $48 \div 6 \cdot 2 + 3^2$

2. Simplify: $2(5 - (3x - 2)) - (x - 4)$

3. Explain in one sentence why $24 \div 3 \cdot 2 \neq 24 \div (3 \cdot 2)$.