

Order of Operations and Evaluating Expressions

Algebra 1 • Section 1.2

Name: _____

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Quick Review and Helpful Hints

Algebra becomes easier when every symbol has a job. Read the operation first, keep signs attached to their terms, and check that each step still means the same thing as the original expression.

▷ **Example:** Simplify $2(x + 6) + 3x$.

Work: Distribute first: $2(x + 6) = 2x + 12$. Then combine like terms: $2x + 12 + 3x = 5x + 12$.

★ **Answer:** $5x + 12$

◆ Practice Problems

Solve each problem. Show enough work that another student could follow your thinking.

1. Evaluate $9 + 4 \cdot 3$. _____

6. Evaluate $3x^2 - 2x$ when $x = -2$. _____

2. Evaluate $(9 + 4) \cdot 3$. _____

7. Evaluate $(a + b)^2$ when $a = 3$ and $b = 5$. _____

3. Evaluate $2^3 + 18 \div 6$. _____

8. Evaluate $\sqrt{49} + 2^4$. _____

4. Evaluate $30 - (4 + 2)^2$. _____

9. Evaluate $5(12 - 8) + 3^2$. _____

5. Evaluate $\frac{5 + 7}{10 - 6}$. _____

10. Evaluate $\frac{24}{3 + 5} + 6$. _____

◆ Word Problems

11. A gym charges \$18 plus \$4 per class. Evaluate $18 + 4c$ for $c = 7$. _____

12. A rectangle has length $2x + 1$ and width $x + 4$. Find the perimeter when $x = 5$. _____



Answer Keys

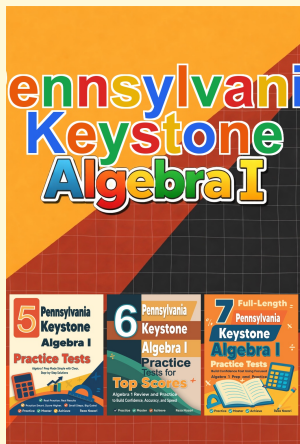
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|-------|----------|
| 1. 21 | 7. 64 |
| 2. 39 | 8. 23 |
| 3. 11 | 9. 29 |
| 4. -6 | 10. 9 |
| 5. 3 | 11. \$46 |
| 6. 16 | 12. 40 |

Step-by-Step Explanations

- Multiplication is hungrier than addition, so it eats first: $4 \cdot 3 = 12$, and then $9 + 12 = 21$.
- Parentheses get VIP treatment, so $9 + 4 = 13$ happens before anything else. After that it's just $13 \cdot 3 = 39$.
- Powers and division both outrank addition, so handle them quietly first: $2^3 = 8$, $18 \div 6 = 3$, then $8 + 3 = 11$.
- Work outward from the inside: $4 + 2 = 6$, then square that to get 36. Since 36 is bigger than 30, you dip below zero to -6 .
- A fraction bar is like invisible parentheses around the top and bottom. Tidy each one — 12 over 4 — and the division gives 3.
- Wrap the -2 in parentheses so the negative behaves: $3(-2)^2 = 12$ and $-2(-2) = +4$, which add to 16.
- Plug in before you square — the parentheses want the sum finished first. So $3 + 5 = 8$, and $8^2 = 64$.
- Square roots and exponents both like to go early: $\sqrt{49} = 7$, $2^4 = 16$, and then you simply add them for 23.
- Clear the parentheses first ($12 - 8 = 4$), then $5(4) = 20$. The power $3^2 = 9$ joins in last for a total of 29.
- Finish the bottom of the fraction before dividing: $3 + 5 = 8$, so $24 \div 8 = 3$, and tacking on 6 gives 9.
- Let c be 7 classes. Multiply before adding, so $4(7) = 28$, then stack on the \$18 joining fee for \$46.
- Find the actual sides at $x = 5$ first: length 11, width 9. Perimeter walks all four sides, so $2(11) + 2(9) = 40$.



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