Evaluating Algebraic Expressions & Combining Like Terms

"Substitute carefully, group your twins (like terms), and mind the exponents!"

Mini-Review

Evaluate by substitution: Replace each variable with the given number(s), then follow order of operations (PEMDAS).
Exponents: x^2 means $x \cdot x$; compute exponents before multiplying/adding.
Like terms: Terms are like if they have *exactly* the same variable part (same letters and exponents). Combine by adding/subtracting coefficients.

1. (Evaluate with substitution) For $x = 3$, evaluate:

$$2x^2 - 5x + 4.$$

2. (Evaluate with two variables) For $a = -2$ and $b = 5$, evaluate:

$$3a^2 - 2ab + b.$$

3. (Careful with parentheses & exponents) For $x = -1$ and $y = 2$, evaluate:

$$(2x - 3y)^2.$$

4. (Fractions/decimals welcome) For $t = \frac{1}{2}$, evaluate:

$$8t^2 - 3t + \frac{1}{4}.$$

5. (Word problem — cost) A notebook costs \$2 plus \$0.35 per pen.
Write an expression for the total cost if you buy n pens, then evaluate it for $n = 8$.

6. (Word problem — volume) A jug starts with 1.5 L of water and gains 0.75 L each minute.
Write an expression for the amount after m minutes and evaluate it at $m = 12$.

Mini-Review

Combining like terms: Only combine terms with the same variable and the same exponent. Constants are like terms with each other. Example: $5x+3x-2 = 8x-2$.

7. (Combine like terms) Simplify:

$$3x + 4x - 5 + 7 - 2x.$$

8. (Like terms with exponents) Simplify:

$$5a^2 - 3a + 2a^2 + 4 - 7a - 1.$$

9. (Decimals count too) Simplify:

$$0.5y + 1.2 - 1.5y + 3.8 + y.$$

10. (Simplify then evaluate) For $x = -2$, first simplify, then evaluate:

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

11. (Like terms, then plug in) Simplify, then evaluate at $p = 3$:

$$2p^2 + 3p - p^2 + 7 - 4p + 2p^2.$$

12. (Word problem — recipe) A trail mix uses $3c$ cups of cereal, $2c$ cups of nuts, and 0.5 cup of raisins.
(a) Write an expression for total cups. (b) Simplify. (c) Evaluate for $c = 1.5$.