NAME

Module 2 Writing and Simplifying Algebraic Expressions
Lesson 4 Combining Like Terms

Simplify each expression.

1. $3r + 4r$ **$7r$**
2. $12x - 15x$ **$-3x$**
3. $-a + 6m - 3a + 2m$ **$-4a + 8m$**
4. $29 - 8k + 16k$ **$8k + 29$**
5. $2t - t - 7t$ **$-6t$**
6. $5x^3y - 7zy^2 - 5x^3y + 7zy^2$ **0**
7. $7d + 5 - 6 + 4d$ **$11d - 1$**
8. $9b + 10 - b + 3y - 5$ **$8b + 3y + 5$**
9. $4 + 5q - q - 6.5$ **$4q - 2.5$**
10. $44f + (36f + 23f)$ **$103f$**
11. $56a + 49 - 12a + 21$ **$44a + 70$**
12. $5j^2 - 6j + 2j^2$ **$7j^2 - 6j$**
13. $13xy^2 + 16x^2y - 7x^2y$ **$9x^2y + 13xy^2$**
14. $7b + c - b + \frac{3}{5}c$ **$6b + \frac{8}{5}c$**
15. $4s + 16 + 5s$ **$9s + 16$**
16. $-4 + 2m - 15y - 21y + 17m$ **$19m - 36y - 4$**
17. $3 + m^3 - 6m^4 - 5n^2 + 8 - 2n^2$ **$-6m^4 + m^3 - 7n^2 + 11$**
18. $18 + 37n + 22 - 44 + 120m - 4n + 69$ **$120m + 33n + 65$**
19. $15 - (10a - 20)$ **$-10a + 35$**
20. $(40 - 20p) - (2p^2 + 6p)$ **$-2p^2 - 26p + 40$**

Journal

1. Explain why $4x^2y$ and $4xy^2$ are not like terms.
2. Explain why $4a^2 + 3a \neq 7a^3$.
3. To simplify the polynomial $6x + 3 + 4x + 2$, we can write $6x + 3 + 4x + 2 = 6x + 4x + 3 + 2 = 10x + 5$. Name the property used to rewrite $6x + 3 + 4x + 2$ as $6x + 4x + 3 + 2$ and explain how it is used.
4. Explain the process used to add polynomials.
5. Explain the process used to subtract polynomials.

Cumulative Review

Name the property shown in each of the following.

1. $\frac{1}{2} \cdot 1 = 1 \cdot \frac{1}{2}$

Commutative Property of Multiplication

2. $125x - 75 = 25(5x - 3)$

Distributive Property of Multiplication over Addition

3. $0 = -3f + 3f$

Additive Inverse Property

4. $341x + (114x + 65) = (341x + 114x) + 65$

Associative Property of Addition

Simplify each expression.

5. $34y - 25y + 32y$

41y

6. $5t(5s - 16)$

25st – 80t

7. $35h^3 - 16t^2 + 24t^3 - 25h^3$

$10h^3 + 24t^3 - 16t^2$

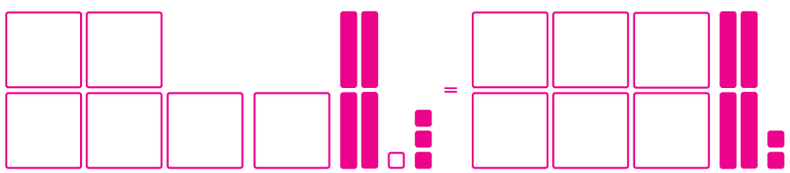
8. $9a + 3b - 3 - 4a + 7 - 8b + 16 - 12b$

5a – 17b + 20

Manipulative Problems

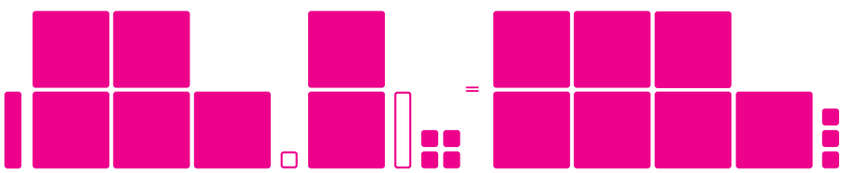
Simplify using Algebra Tiles to model each expression.

1. $5x^2 + x^2 - 4x + 1 - 3$



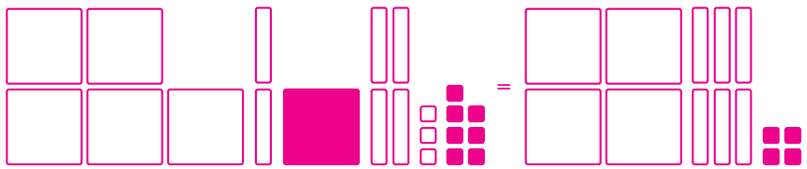
$6x^2 - 4x - 2$

2. $-x - 5x^2 + 1 - 2x^2 + x - 4$



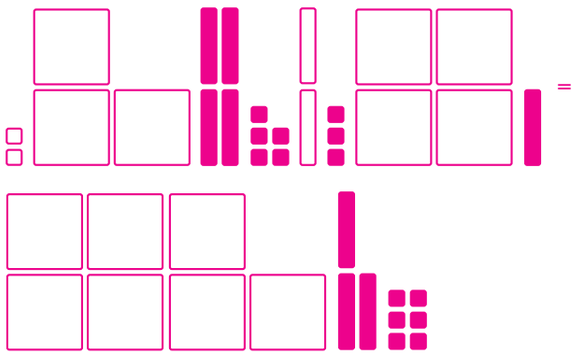
$-7x^2 - 3$

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



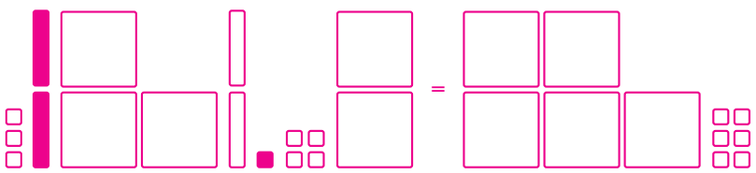
$4x^2 + 6x - 4$

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



$7x^2 - 3x - 6$

5. $3 - 2x + 3x^2 + 2x - 1 + 4 + 2x^2$



$5x^2 + 6$

Possible Journal Responses

1. **If terms have one or more variables, the variables and the exponents on those variables must be identical for the terms to be like terms. $4x^2y$ and $4xy^2$ have the variables raised to different powers. $4x^2y$ has x squared and y to the first power while $4xy^2$ has x to the first power and y squared. Therefore, they are not like terms.**
2. **$4a^2 + 3a$ cannot be simplified because $4a^2$ and $3a$ are not like terms. Therefore, the expression must be left as a binomial.**
3. **The Commutative Property of Addition is used to rewrite $3 + 4x$ as $4x + 3$.**
4. **To add polynomials, just drop the parentheses outside each polynomial. Then, combine like terms.**
5. **To subtract one polynomial from another, we add the opposite of the second polynomial, which means you change the sign of every term in the second polynomial and add the polynomials by combining like terms.**