

Simplifying Polynomials

Name: _____

Date: _____

Score: _____ / 18

Quick Review and Helpful Hints

To simplify a polynomial, first remove parentheses: distribute any coefficient, and remember that a *minus sign* in front of parentheses flips the sign of every term inside. Then combine like terms and write the result in descending order of degree.

▶ **Example:** Simplify $(3x^2 + 2x) - (x^2 - 4x)$. **Work:** Distribute the minus sign across the second group: $3x^2 + 2x - x^2 + 4x$. Now combine like terms: $(3x^2 - x^2) + (2x + 4x)$. ★ **Answer:** $2x^2 + 6x$

◆ Practice Problems

Simplify each polynomial expression.

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

2. $(4a - 2) + (a + 6)$

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

4. $(6y - 4) - (2y - 9)$

5. $2(x + 4) + 3(x - 1)$

6. $(5m^2 - 3m) + (2m^2 + m)$

7. $(7 - 2x) - (3 - 5x)$

8. $4(2a - 1) - (a + 3)$

9. $(x^2 + 5x - 2) + (3x^2 - 2x + 6)$

10. $(8b + 1) - (b - 7)$

11. $3(x^2 - 2) + 2(x^2 + 5)$

12. $(9p - 4) - (4p - 4)$

13. $(2x^2 - x + 3) - (x^2 + 4x - 1)$

14. $5(y + 2) - 2(2y - 3)$

◆ Word Problems

15. A triangle has sides of length $x + 2$, $2x - 1$, and $3x + 4$. Write its perimeter in simplest form.

16. A company's revenue is $(5x^2 + 3x)$ and its cost is $(2x^2 - x)$. Revenue minus cost gives profit. Simplify the profit.

17. Add the polynomials $(4x^2 - 2x + 7)$ and $(x^2 + 6x - 3)$.

18. Subtract $(3a - 5)$ from $(7a + 2)$.



Answer Keys

- | | | |
|----------------|--------------------|---------------------|
| 1. $7x + 2$ | 7. $3x + 4$ | 13. $x^2 - 5x + 4$ |
| 2. $5a + 4$ | 8. $7a - 7$ | 14. $y + 16$ |
| 3. $2x^2 + 3x$ | 9. $4x^2 + 3x + 4$ | 15. $6x + 5$ |
| 4. $4y + 5$ | 10. $7b + 8$ | 16. $3x^2 + 4x$ |
| 5. $5x + 5$ | 11. $5x^2 + 4$ | 17. $5x^2 + 4x + 4$ |
| 6. $7m^2 - 2m$ | 12. $5p$ | 18. $4a + 7$ |

Step-by-Step Explanations

1. Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Combine like terms: $(2x + 5x) + (3 - 1) = 7x + 2$. So the final answer is $7x + 2$.
2. A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Combine: $(4a + a) + (-2 + 6) = 5a + 4$. So the final answer is $5a + 4$.
3. Step by step: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Distribute the minus: $3x^2 + x - x^2 + 2x = 2x^2 + 3x$. So the final answer is $2x^2 + 3x$.
4. Take it one move at a time: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Distribute the minus: $6y - 4 - 2y + 9 = 4y + 5$. So the final answer is $4y + 5$.
5. Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Distribute: $2x + 8 + 3x - 3 = 5x + 5$. So the final answer is $5x + 5$.
6. A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Combine: $(5m^2 + 2m^2) + (-3m + m) = 7m^2 - 2m$. So the final answer is $7m^2 - 2m$.
7. Step by step: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Distribute the minus: $7 - 2x - 3 + 5x = 3x + 4$. So the final answer is $3x + 4$.
8. Take it one move at a time: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Distribute: $8a - 4 - a - 3 = 7a - 7$. So the final answer is $7a - 7$.
9. Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Combine: $(x^2 + 3x^2) + (5x - 2x) + (-2 + 6) = 4x^2 + 3x + 4$. So the final answer is $4x^2 + 3x + 4$.
10. A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Distribute the minus: $8b + 1 - b + 7 = 7b + 8$. So the final answer is $7b + 8$.
11. Step by step: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Distribute: $3x^2 - 6 + 2x^2 + 10 = 5x^2 + 4$. So the final answer is $5x^2 + 4$.
12. Take it one move at a time: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Distribute the minus: $9p - 4 - 4p + 4 = 5p$. So the final answer is $5p$.
13. Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Distribute the minus: $2x^2 - x + 3 - x^2 - 4x + 1 = x^2 - 5x + 4$. So the final answer is $x^2 - 5x + 4$.
14. A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Distribute: $5y + 10 - 4y + 6 = y + 16$. So the final answer is $y + 16$.
15. Step by step: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Add the three sides: $(x + 2) + (2x - 1) + (3x + 4) = 6x + 5$. So the final answer is $6x + 5$.
16. Take it one move at a time: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Profit = $(5x^2 + 3x) - (2x^2 - x) = 5x^2 + 3x - 2x^2 + x = 3x^2 + 4x$. So the final answer is $3x^2 + 4x$.
17. Start by naming the process: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is Combine: $(4x^2 + x^2) + (-2x + 6x) + (7 - 3) = 5x^2 + 4x + 4$. So the final answer is $5x^2 + 4x + 4$.
18. A good way to think about this is: Read what the problem is asking, choose the matching rule, write the setup, and then simplify one step at a time. The setup/work is "Subtract from" means $(7a + 2) - (3a - 5) = 7a + 2 - 3a + 5 = 4a + 7$. So the final answer is $4a + 7$.



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