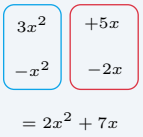
Adding and Subtracting Polynomials

Name: _____	Date: _____	Score: _____ / 18

Quick Review and Helpful Hints

Add or subtract polynomials by combining *like terms* – terms with the same variable and exponent. When *subtracting*, first distribute the minus sign to every term in the second polynomial (it flips each sign), then combine.

▷ **Example:** Simplify $(3x^2 + 5x) - (x^2 - 2x)$. **Work:** Distribute the minus sign: $3x^2 + 5x - x^2 + 2x$. Combine like terms: $(3x^2 - x^2) + (5x + 2x)$. ★ **Answer:** $2x^2 + 7x$



Combine like terms column by column.

Practice Problems

Simplify each expression.

1. $(3x + 7) + (5x - 2)$ _____
2. $(2x + 1) + (4x + 6)$ _____
3. $(x^2 + 4x) + (2x^2 - x + 3)$ _____
4. $(5a - 3) + (2a + 8)$ _____
5. $(6x^2 - 3x + 1) - (2x^2 + x - 4)$ _____
6. $(7a^2 - 5a) - (3a^2 - 5a + 2)$ _____
7. $(4y^3 + y - 6) + (y^3 - 3y + 9)$ _____
8. $(8m^2 - 2m + 5) - (8m^2 - 2m + 5)$ _____
9. $(x^2 + 3xy + y^2) + (2x^2 - xy)$ _____
10. $(9p - 4) - (3p + 6)$ _____
11. $(2x^2 + 5) + (3x^2 - 2)$ _____
12. $(10x - 7) - (4x - 3)$ _____
13. $(a^2 + 2a + 1) + (a^2 - 2a - 1)$ _____
14. $(5x^2 - x) - (2x^2 - 3x + 4)$ _____

Word Problems

15. One side of a path is $(2x + 3)$ m and another is $(x + 5)$ m. Write their total length, simplified. _____
16. A rectangle has sides $(3x + 1)$ and $(x + 2)$. Simplify $2[(3x + 1) + (x + 2)]$ for its perimeter. _____
17. Profit is revenue $(5x^2 + 20x)$ minus cost $(2x^2 + 8x + 10)$. Write the profit, simplified. _____
18. Add the polynomials $(x^2 + x)$ and $(3x^2 - 4x + 2)$. _____

Answer Keys

1. $8x + 5$	**7.** $5y^3 - 2y + 3$	**13.** $2a^2$
2. $6x + 7$	**8.** 0	**14.** $3x^2 + 2x - 4$
3. $3x^2 + 3x + 3$	**9.** $3x^2 + 2xy + y^2$	**15.** $3x + 8$
4. $7a + 5$	**10.** $6p - 10$	**16.** $8x + 6$
5. $4x^2 - 4x + 5$	**11.** $5x^2 + 3$	**17.** $3x^2 + 12x - 10$
6. $4a^2 - 2$	**12.** $6x - 4$	**18.** $4x^2 - 3x + 2$

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: $(3x + 5x) + (7 - 2) = 8x + 5$. So the final answer is $8x + 5$.

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: $(2x + 4x) + (1 + 6) = 6x + 7$. So the final answer is $6x + 7$.

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 Group by power: $(x^2 + 2x^2) + (4x - x) + 3 = 3x^2 + 3x + 3$. So the final answer is $3x^2 + 3x + 3$.

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 Combine: $(5a + 2a) + (-3 + 8) = 7a + 5$. So the final answer is $7a + 5$.

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 the minus: $6x^2 - 3x + 1 - 2x^2 - x + 4$. Combine: $4x^2 - 4x + 5$. So the final answer is $4x^2 - 4x + 5$.

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 Distribute the minus: $7a^2 - 5a - 3a^2 + 5a - 2$. The a-terms cancel: $4a^2 - 2$. So the final answer is $4a^2 - 2$.

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 Add like terms: $(4y^3 + y^3) + (y - 3y) + (-6 + 9) = 5y^3 - 2y + 3$. So the final answer is $5y^3 - 2y + 3$.

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 Subtracting a polynomial from itself leaves nothing: 0. So the final answer is 0.

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 like terms: $(x^2 + 2x^2) + (3xy - xy) + y^2 = 3x^2 + 2xy + y^2$. So the final answer is $3x^2 + 2xy + y^2$.

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: $9p - 4 - 3p - 6$. Combine: $6p - 10$. So the final answer is $6p - 10$.

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 Add the x^2 terms and the constants: $5x^2 + 3$. So the final answer is $5x^2 + 3$.

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: $10x - 7 - 4x + 3 = 6x - 4$. So the final answer is $6x - 4$.

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 The a-terms and constants cancel, leaving $a^2 + a^2 = 2a^2$. So the final answer is $2a^2$.

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 the minus: $5x^2 - x - 2x^2 + 3x - 4$. Combine: $3x^2 + 2x - 4$. So the final answer is $3x^2 + 2x - 4$.

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 like terms: $(2x + x) + (3 + 5) = 3x + 8$. So the final answer is $3x + 8$.

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 Inside: $(3x + 1) + (x + 2) = 4x + 3$. Then $2(4x + 3) = 8x + 6$. So the final answer is $8x + 6$.

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 Distribute the minus: $5x^2 + 20x - 2x^2 - 8x - 10$. Combine: $3x^2 + 12x - 10$. So the final answer is $3x^2 + 12x - 10$.

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 Combine like terms: $(x^2 + 3x^2) + (x - 4x) + 2 = 4x^2 - 3x + 2$. So the final answer is $4x^2 - 3x + 2$.

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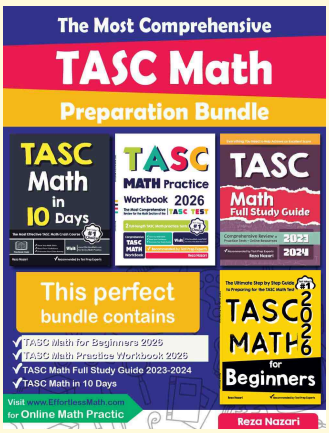

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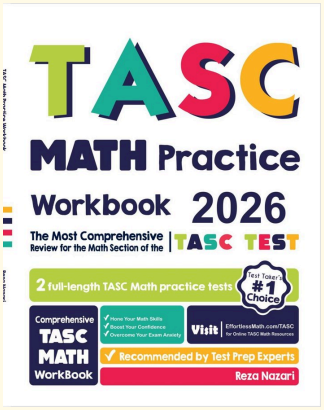

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