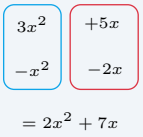
Adding and Subtracting Polynomials

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:** $2x^2 + 7x$



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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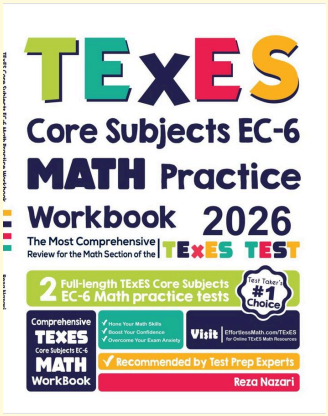

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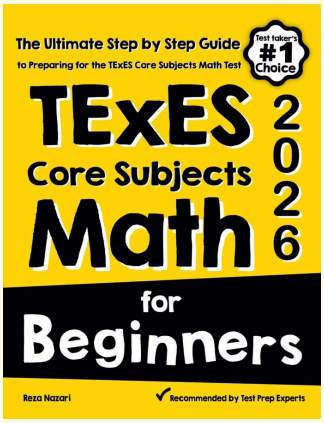

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