Factoring Trinomials

Name: _____	Date: _____	Score: _____ / 18

Quick Review and Helpful Hints

To factor $x^2 + bx + c$, find two numbers that *multiply* to c and *add* to b. Then write the factors as $(x + \square)(x + \square)$ using those numbers. Watch the signs: a positive c means the numbers share a sign; a negative c means they have opposite signs.

▷ **Example:** Factor $x^2 + 5x + 6$. **Work:** Find two numbers that multiply to 6 and add to 5: that's 2 and 3. Write them as factors.

★ **Answer:** $(x + 2)(x + 3)$

	x	2
x	x^2	$2x$
3	$3x$	6

$(x + 2)(x + 3) = x^2 + 5x + 6.$

Practice Problems

Factor each trinomial.

1. $x^2 + 5x + 6$ _____
2. $x^2 + 8x + 15$ _____
3. $x^2 - 6x + 8$ _____
4. $x^2 - 3x - 10$ _____
5. $x^2 + 2x - 24$ _____
6. $x^2 - 10x + 21$ _____
7. $x^2 + x - 30$ _____
8. $x^2 - 11x + 30$ _____
9. $x^2 + 4x - 12$ _____
10. $x^2 + 7x + 12$ _____
11. $x^2 - 9x + 20$ _____
12. $x^2 + x - 12$ _____
13. $x^2 - 4x - 21$ _____
14. $x^2 + 9x + 14$ _____

Word Problems

15. A rectangle has area $x^2 + 7x + 10$. Write its length and width as factors. _____
16. A rectangular garden model has area $x^2 - 5x - 14$. Factor it to represent possible side expressions. _____
17. The area of a square plus its border is $x^2 + 6x + 9$. Factor it. _____
18. A photo mat area is modeled by $x^2 + 10x + 24$. Factor it to show the side expressions. _____

Answer Keys

1. $(x+2)(x+3)$	**7.** $(x+6)(x-5)$	**13.** $(x-7)(x+3)$
2. $(x+3)(x+5)$	**8.** $(x-5)(x-6)$	**14.** $(x+2)(x+7)$
3. $(x-2)(x-4)$	**9.** $(x+6)(x-2)$	**15.** $(x+2)(x+5)$
4. $(x-5)(x+2)$	**10.** $(x+3)(x+4)$	**16.** $(x-7)(x+2)$
5. $(x+6)(x-4)$	**11.** $(x-4)(x-5)$	**17.** $(x+3)^2$
6. $(x-3)(x-7)$	**12.** $(x+4)(x-3)$	**18.** $(x+4)(x+6)$

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 Two numbers that multiply to 6 and add to 5 are 2 and 3: $(x+2)(x+3)$. So the final answer is $(x+2)(x+3)$.

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 Multiply to 15, add to 8: 3 and 5: $(x+3)(x+5)$. So the final answer is $(x+3)(x+5)$.

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 Multiply to 8, add to -6: both negative, -2 and -4: $(x-2)(x-4)$. So the final answer is $(x-2)(x-4)$.

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 Multiply to -10, add to -3: -5 and 2: $(x-5)(x+2)$. So the final answer is $(x-5)(x+2)$.

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 Multiply to -24, add to 2: 6 and -4: $(x+6)(x-4)$. So the final answer is $(x+6)(x-4)$.

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 Multiply to 21, add to -10: -3 and -7: $(x-3)(x-7)$. So the final answer is $(x-3)(x-7)$.

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 Multiply to -30, add to 1: 6 and -5: $(x+6)(x-5)$. So the final answer is $(x+6)(x-5)$.

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 Multiply to 30, add to -11: -5 and -6: $(x-5)(x-6)$. So the final answer is $(x-5)(x-6)$.

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 Multiply to -12, add to 4: 6 and -2: $(x+6)(x-2)$. So the final answer is $(x+6)(x-2)$.

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 Multiply to 12, add to 7: 3 and 4: $(x+3)(x+4)$. So the final answer is $(x+3)(x+4)$.

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 Multiply to 20, add to -9: -4 and -5: $(x-4)(x-5)$. So the final answer is $(x-4)(x-5)$.

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 Multiply to -12, add to 1: 4 and -3: $(x+4)(x-3)$. So the final answer is $(x+4)(x-3)$.

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 Multiply to -21, add to -4: -7 and 3: $(x-7)(x+3)$. So the final answer is $(x-7)(x+3)$.

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 Multiply to 14, add to 9: 2 and 7: $(x+2)(x+7)$. So the final answer is $(x+2)(x+7)$.

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 Multiply to 10, add to 7: 2 and 5: $(x+2)(x+5)$. So the final answer is $(x+2)(x+5)$.

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 Multiply to -14, add to -5: -7 and 2: $(x-7)(x+2)$. So the final answer is $(x-7)(x+2)$.

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 Multiply to 9, add to 6: 3 and 3, a perfect square: $(x+3)^2$. So the final answer is $(x+3)^2$.

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 Multiply to 24, add to 10: 4 and 6: $(x+4)(x+6)$. So the final answer is $(x+4)(x+6)$.

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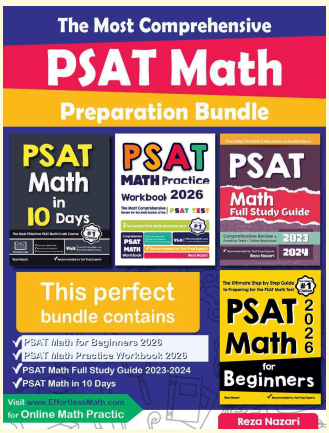

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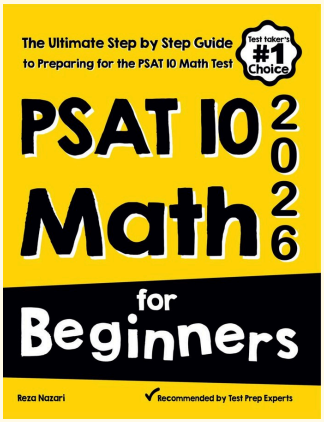

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