Factoring Trinomials x2 bx c

Name: _____	Date: _____	Score: _____ / 24

Quick Review

To factor a trinomial of the form $x^2 + bx + c$ (with leading coefficient 1), find two numbers that **multiply to** c and **add to** b. Those two numbers go inside the parentheses: $x^2 + bx + c = (x + p)(x + q)$ where $pq = c$ and $p + q = b$. **Sign tips**: if $c > 0$, both numbers have the same sign (positive if $b > 0$, negative if $b < 0$). If $c < 0$, the two numbers have opposite signs — the larger absolute value matches the sign of b. Some trinomials are **prime** — they can't be factored over integers. If no integer pair works, factor over the rationals using the quadratic formula or declare it prime.

PRACTICE

Factor each trinomial.

1. $x^2 + 5x + 6$ _____

2. $x^2 + 7x + 12$ _____

3. $x^2 - 5x + 6$ _____

4. $x^2 - x - 12$ _____

5. $x^2 + x - 6$ _____

6. $x^2 - 9x + 20$ _____

7. $x^2 + 8x + 15$ _____

8. $x^2 - 3x - 10$ _____

9. $x^2 + 2x - 15$ _____

10. $x^2 - 7x + 12$ _____

11. $x^2 + 10x + 25$ _____

12. $x^2 - 6x + 9$ _____

13. $x^2 + x + 5$ _____

14. $x^2 - 16$ _____

15. $x^2 + 11x + 18$ _____

16. $x^2 - 2x - 24$ _____

17. $x^2 + 6x - 7$ _____

18. $x^2 - 13x + 40$ _____

19. $x^2 + 25$ _____

20. $x^2 - 12x + 36$ _____

Word Problems

21. A rectangular garden has area $x^2 + 9x + 20$ ft^2. Factor the trinomial to find possible length and width expressions.

_____

22. A rectangular label has area $x^2 - 7x + 10$ square inches. Factor the expression to find possible side lengths.

_____

23. A garden path model leads to $x^2 - 8x + 15 = 0$ when the area condition is met. Solve by factoring to find the possible values of x.

_____

24. A small rocket's height model reaches ground level when $x^2 + 2x - 8 = 0$. Factor to find the model's two z

_____

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Answer Keys

1. $(x+2)(x+3)$
2. $(x+3)(x+4)$
3. $(x-2)(x-3)$
4. $(x-4)(x+3)$
5. $(x+3)(x-2)$
6. $(x-4)(x-5)$
7. $(x+3)(x+5)$
8. $(x-5)(x+2)$
9. $(x+5)(x-3)$
10. $(x-3)(x-4)$
11. $(x+5)^2$
12. $(x-3)^2$
13. prime
14. $(x-4)(x+4)$
15. $(x+2)(x+9)$
16. $(x-6)(x+4)$
17. $(x+7)(x-1)$
18. $(x-5)(x-8)$
19. prime
20. $(x-6)^2$
21. $(x+4)(x+5)$
22. $(x-2)(x-5)$
23. $x=3$ or $x=5$
24. $x=2$ or $x=-4$

Step-by-Step Tutor Notes

1. Start with the definition the problem is testing, then apply it directly. $2\cdot 3=6$, $2+3=5$. So the answer is $(x+2)(x+3)$.
2. Use the clue in the question first, then let the arithmetic finish the job. $3\cdot 4=12$, $3+4=7$. So the answer is $(x+3)(x+4)$.
3. Focus on the main idea of the problem, then simplify carefully. Both negative: $-2, -3$. So the answer is $(x-2)(x-3)$.
4. This is a good place to slow down, check the notation, and simplify cleanly. $-4\cdot 3=-12$, $-4+3=-1$. So the answer is $(x-4)(x+3)$.
5. Start with the definition the problem is testing, then apply it directly. $3, -2$. So the answer is $(x+3)(x-2)$.
6. This is a good place to slow down, check the notation, and simplify cleanly. Both negative. So the answer is $(x-4)(x-5)$.
7. This is a good place to slow down, check the notation, and simplify cleanly. $3, 5$. So the answer is $(x+3)(x+5)$.
8. This is a good place to slow down, check the notation, and simplify cleanly. $-5, 2$. So the answer is $(x-5)(x+2)$.
9. Take it one clear step at a time and keep the original question in mind. $5, -3$. So the answer is $(x+5)(x-3)$.
10. Take it one clear step at a time and keep the original question in mind. $-3, -4$. So the answer is $(x-3)(x-4)$.
11. Start with the definition the problem is testing, then apply it directly. Perfect square: $5\cdot 5=25$, $5+5=10$. So the answer is $(x+5)^2$.
12. Focus on the main idea of the problem, then simplify carefully. Perfect square: both -3. So the answer is $(x-3)^2$.
13. Work one inverse operation at a time and keep both sides balanced. No integer pair multiplies to 5 and adds to 1. After simplifying, the answer is prime.
14. This is a good place to slow down, check the notation, and simplify cleanly. Difference of squares (no middle term). So the answer is $(x-4)(x+4)$.
15. Start with the definition the problem is testing, then apply it directly. $2, 9$. So the answer is $(x+2)(x+9)$.
16. Start with the definition the problem is testing, then apply it directly. $-6, 4$. So the answer is $(x-6)(x+4)$.
17. Take it one clear step at a time and keep the original question in mind. $7, -1$. So the answer is $(x+7)(x-1)$.
18. Use the clue in the question first, then let the arithmetic finish the job. $-5, -8$. So the answer is $(x-5)(x-8)$.
19. First identify the feature of the graph or equation that matches the wording of the question. Sum of squares doesn't factor over reals. That leads to prime.
20. Take it one clear step at a time and keep the original question in mind. Perfect square. So the answer is $(x-6)^2$.
21. Name the quantities first so the model is easy to read. $4\cdot 5=20$, $4+5=9$. So $(x+4)(x+5)$.
22. Look for two numbers that multiply to 10 and add to -7: -2 and -5. So the side expressions can be $x-2$ and $x-5$.
23. First identify the feature of the graph or equation that matches the wording of the question. Factor: $(x-3)(x-5)=0$. Zero-product: $x=3$ or $x=5$. That leads to $x=3$ or $x=5$.
24. First identify the feature of the graph or equation that matches the wording of the question. $(x+4)(x-2)=0$. Zero-product gives $x=-4$ or $x=2$. That leads to $x=2$ or $x=-4$.

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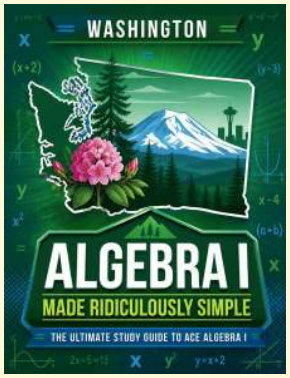

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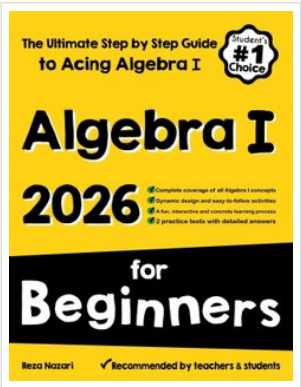

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