Factoring Trinomials ax2 bx c

Name: _____	Date: _____	Score: _____ / 24

Quick Review

To factor $ax^2 + bx + c$ when $a \neq 1$, use the **AC method**: **(1)** multiply $a \cdot c$; **(2)** find two numbers that multiply to ac and add to b; **(3)** split the middle term using those numbers; **(4)** factor by grouping. **Always factor out the GCF first** if there is one. Some trinomials are prime. As a shortcut for small a, you can also use trial and error: write $(\_x + \_)(\_x + \_)$ and try integer pairs for each blank until FOIL gives the original. The AC method is more systematic and almost always works when an integer factoring exists.

PRACTICE

Factor each trinomial.

1. $2x^2 + 5x + 3$ _____

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

3. $2x^2 - 7x + 3$ _____

4. $5x^2 + 11x + 2$ _____

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

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

7. $4x^2 + 8x + 3$ _____

8. $2x^2 + x - 1$ _____

9. $3x^2 + 8x + 4$ _____

10. $5x^2 - 13x + 6$ _____

11. $4x^2 - 4x + 1$ _____

12. $9x^2 + 12x + 4$ _____

13. $6x^2 + 7x + 2$ _____

14. $8x^2 - 2x - 3$ _____

15. $2x^2 + 9x + 10$ _____

16. $3x^2 - 7x + 2$ _____

17. $4x^2 + 3x - 7$ _____

18. $6x^2 - 13x + 6$ _____

19. $10x^2 + 9x - 9$ _____

20. $2x^2 + 3x + 5$ _____

Word Problems

21. A projectile model reaches ground level when $2t^2 + 5t - 3 = 0$. Factor to find the positive time.

_____

22. A rectangular sign has area $6x^2 + 7x + 2$ square feet. Factor to find possible length and width expressions.

_____

23. A fundraiser's break-even model is $3x^2 - 2x - 1 = 0$. Factor to find the values of x where profit is zero.

_____

24. A rectangular sign has area $5x^2 + 12x + 4$ square feet. Factor to find possible side expressions.

_____

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Answer Keys

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

Step-by-Step Tutor Notes

1. $ac=6$, pair $2,3$. Split: $2x^2+2x+3x+3=2x(x+1)+3(x+1)$.
2. Focus on the main idea of the problem, then simplify carefully. $ac=24$, pair $4,6$. So the answer is $(3x+4)(x+2)$.
3. Focus on the main idea of the problem, then simplify carefully. $ac=6$, pair $-1,-6$. So the answer is $(2x-1)(x-3)$.
4. Take it one clear step at a time and keep the original question in mind. $ac=10$, pair $1,10$. So the answer is $(5x+1)(x+2)$.
5. Start with the definition the problem is testing, then apply it directly. $ac=-6$, pair $1,-6$. So the answer is $(3x+1)(x-2)$.
6. $ac=-36$, pair $-4,9$. Split: $6x^2-4x+9x-6=2x(3x-2)+3(3x-2)$.
7. This is a good place to slow down, check the notation, and simplify cleanly. $ac=12$, pair $2,6$. So the answer is $(2x+1)(2x+3)$.
8. Start with the definition the problem is testing, then apply it directly. $ac=-2$, pair $-1,2$. So the answer is $(2x-1)(x+1)$.
9. Start with the definition the problem is testing, then apply it directly. $ac=12$, pair $2,6$. So the answer is $(3x+2)(x+2)$.
10. Take it one clear step at a time and keep the original question in mind. $ac=30$, pair $-3,-10$. So the answer is $(5x-3)(x-2)$.
11. Use the clue in the question first, then let the arithmetic finish the job. Perfect square trinomial. So the answer is $(2x-1)^2$.
12. Use the clue in the question first, then let the arithmetic finish the job. Perfect square: $(3x)^2+2(3x)(2)+4$. So the answer is $(3x+2)^2$.
13. Use the clue in the question first, then let the arithmetic finish the job. $ac=12$, pair $3,4$. So the answer is $(3x+2)(2x+1)$.
14. Use the clue in the question first, then let the arithmetic finish the job. $ac=-24$, pair $-6,4$. So the answer is $(4x-3)(2x+1)$.
15. Focus on the main idea of the problem, then simplify carefully. $ac=20$, pair $4,5$. So the answer is $(2x+5)(x+2)$.
16. Focus on the main idea of the problem, then simplify carefully. $ac=6$, pair $-1,-6$. So the answer is $(3x-1)(x-2)$.
17. Focus on the main idea of the problem, then simplify carefully. $ac=-28$, pair $7,-4$. So the answer is $(4x+7)(x-1)$.
18. Take it one clear step at a time and keep the original question in mind. $ac=36$, pair $-4,-9$. So the answer is $(3x-2)(2x-3)$.
19. This is a good place to slow down, check the notation, and simplify cleanly. $ac=-90$, pair $-6,15$. So the answer is $(5x-3)(2x+3)$.
20. Take it one clear step at a time and keep the original question in mind. $ac=10$, no pair sums to 3. So the answer is prime.
21. Factor: $(2t-1)(t+3)=0$. So $t=\frac{1}{2}$ or $t=-3$. Time cannot be negative, so the positive time is $\frac{1}{2}$ second.
22. Name the quantities first so the model is easy to read. Using AC method or trial and error: $(3x+2)(2x+1)$.
23. First identify the feature of the graph or equation that matches the wording of the question. Factor: $(3x+1)(x-1)=0$. So $x=-\frac{1}{3}$ or $x=1$. That leads to $x=1$ or $x=-\frac{1}{3}$.
24. $ac=20$, pair $2,10$. Split: $5x^2+2x+10x+4=x(5x+2)+2(5x+2)=(5x+2)(x+2)$.

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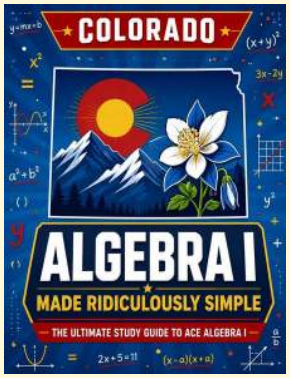

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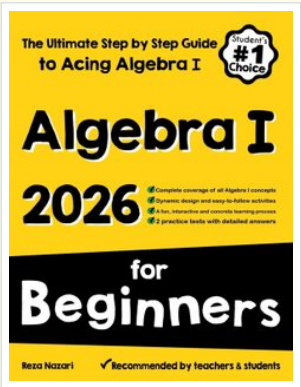

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