

Factoring Trinomials $ax^2 + bx + c$

Name: _____

Date: _____

Score: _____ / 24

Q 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. $2x^2 + 5x + 3$ | _____ | 11. $4x^2 - 4x + 1$ | _____ |
| 2. $3x^2 + 10x + 8$ | _____ | 12. $9x^2 + 12x + 4$ | _____ |
| 3. $2x^2 - 7x + 3$ | _____ | 13. $6x^2 + 7x + 2$ | _____ |
| 4. $5x^2 + 11x + 2$ | _____ | 14. $8x^2 - 2x - 3$ | _____ |
| 5. $3x^2 - 5x - 2$ | _____ | 15. $2x^2 + 9x + 10$ | _____ |
| 6. $6x^2 + 5x - 6$ | _____ | 16. $3x^2 - 7x + 2$ | _____ |
| 7. $4x^2 + 8x + 3$ | _____ | 17. $4x^2 + 3x - 7$ | _____ |
| 8. $2x^2 + x - 1$ | _____ | 18. $6x^2 - 13x + 6$ | _____ |
| 9. $3x^2 + 8x + 4$ | _____ | 19. $10x^2 + 9x - 9$ | _____ |
| 10. $5x^2 - 13x + 6$ | _____ | 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.



Scan Me

Answer Keys

- | | |
|---|--|
| <ol style="list-style-type: none"> 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. $(3x + 2)^2$ | <ol style="list-style-type: none"> 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: $5x^2 + 2x + 10x + 4 = x(5x + 2) + 2(5x + 2) = (5x + 2)(x + 2)$.



Scan Me

Want a Full Algebra 1 Textbook? Try Our North Dakota NDSA Made Simple Book!



North Dakota NDSA Algebra I Made Ridiculously Simple

The friendly, step-by-step Algebra 1 textbook
Plain-English explanations, guided practice, and
review support.



Scan Me

Full Lessons Inside

Concepts
Practice
Mastery

Important: All our test books contain **unique, completely different tests** from each other! Each book offers fresh practice questions—no repeats!

5 Practice Tests

- ✓ 5 complete practice tests with detailed explanations
- ✓ Perfect foundation for NDSA test preparation
- ✓ Builds confidence and test-taking skills
- ✓ High-quality questions aligned with state standards

Start your practice journey!

6 Practice Tests

- ✓ 6 complete practice tests with detailed explanations
- ✓ **Unique tests**—different from the 5 tests book
- ✓ Perfect for more practice after mastering 5 tests
- ✓ Builds even more confidence and test-taking skills
- ✓ Same high-quality questions aligned with standards

Take your practice to the next level!

7 Practice Tests

- ✓ 7 complete practice tests for maximum preparation
- ✓ **Unique tests**—different from 5 and 6 tests books
- ✓ The most comprehensive practice for Algebra 1
- ✓ Ideal for students aiming for top scores
- ✓ Extensive practice builds mastery and confidence

Go all the way with comprehensive practice!

☐ STUDENT FAVORITE • Master Algebra I From the Ground Up ☐



- ✓ 100% Guaranteed
- ✓ Lifetime Support
- ✓ Trusted by Teachers

Start Your Algebra
Journey Today! →

Algebra I for Beginners

Written by a top math teacher & aligned with national and state Algebra I courses. From linear equations to graphing quadratics — explained the easy way.

- ✓ **Complete coverage** of every Algebra I concept — perfect companion to these worksheets
- ✓ **Step-by-step explanations** with worked examples on every topic
- ✓ **QR codes in every chapter** for free video lessons & bonus practice
- ✓ **2 full-length practice tests** with detailed answer keys

★ STUDENT'S #1 CHOICE ★

Teacher-recommended • 12,000+ Happy Students

↓ PDF EDITION



Scan Me

Instant download • any device

☐ PAPERBACK



Scan Me

Paperback on Amazon

Hold it in your hands

Pair these free worksheets with *Algebra I for Beginners* and you have a complete self-paced course — concept lessons, daily practice, and full exam-style reviews, all in one path. →

EffortlessMath.com/product/algebra-i-for-beginners