

Intermediate Algebra

Skill Builder # PF – 6A

Factoring Quadratic Trinomials with Leading Coefficient Different from 1 *ac* – Method: GROUPING

A quadratic trinomial with leading coefficient different from 1 looks like

$$ax^2 + bx + c.$$

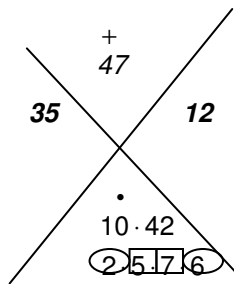
To factor such a trinomial by grouping:

- Find two numbers that multiply to ac and that add up to the middle coefficient b .
- Rewrite the middle term using the two numbers found in Step a.
- Factor by grouping.

Examples

1. $10x^2 + 47x + 42$

Solution:

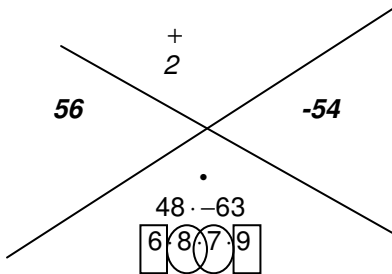


⇒ Thus, $\boxed{35}$ and $\boxed{12}$ are the two numbers that multiply to $10 \cdot 42$ and that add up to 47.

Rewrite $10x^2 + 47x + 42$ as $10x^2 + \mathbf{35x} + \mathbf{12x} + 42$ and factor by grouping:

$$\begin{aligned} & (10x^2 + 35x) + (12x + 42) \\ &= 5x(2x + 7) + 6(2x + 7) \\ &= (2x + 7)(5x + 6) \end{aligned}$$

2. $48x^2 + 2x - 63$



⇒ Thus, $\boxed{56}$ and $\boxed{-54}$ are the two numbers that multiply to $48 \cdot -63$ and that add up to 2.

Rewrite $48x^2 + 2x - 63$ as $48x^2 + \mathbf{56x} - \mathbf{54x} - 63$ and factor by grouping:

$$\begin{aligned} & (48x^2 + 56x) + (-54x - 63) \\ &= 8x(6x + 7) - 9(6x + 7) \\ &= (6x + 7)(8x - 9) \end{aligned}$$

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**Factoring Quadratic Trinomials with Leading Coefficient Different from 1
ac – Method: GROUPING**

Factor the given quadratic trinomial.

1. $15x^2 + 38x + 24$

2. $24x^2 - 50x + 25$

3. $32x^2 + 52x - 45$

4. $35x^2 + 48x - 27$

5. $40y^2 - 37y - 63$

6. $16y^2 - 62y + 55$

7. $33t^2 + 67t - 56$

8. $96t^2 + 116t - 65$

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**Factoring Quadratic Trinomials with Leading Coefficient Different from 1
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Answers

1. $(3x + 4)(5x + 6)$

2. $(4x - 5)(6x - 5)$

3. $(8x - 5)(4x + 9)$

4. $(7x - 3)(5x + 9)$

5. $(8y + 7)(5y - 9)$

6. $(2y - 5)(8y - 11)$

7. $(3t + 8)(11t - 7)$

8. $(12t - 5)(8t + 13)$

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