

## 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

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

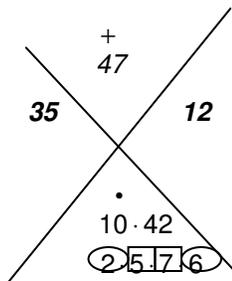
To factor such a trinomial by grouping:

- 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:

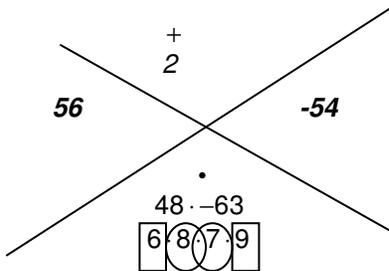


⇒ Thus,  $\boxed{35}$  and  $\textcircled{12}$  are the two numbers that multiply to  $10 \cdot 42$  and that add up to 47.

Rewrite  $10x^2 + 47x + 42$  as  $10x^2 + 35x + 12x + 42$  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  $\textcircled{-54}$  are the two numbers that multiply to  $48 \cdot -63$  and that add up to 2.

Rewrite  $48x^2 + 2x - 63$  as  $48x^2 + 56x - 54x - 63$  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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***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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**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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