

Intermediate Algebra

Skill Builder # PF – 6B

Factoring Quadratic Trinomials with Leading Coefficient Different from 1

ac – Method: BOTTOMS – UP

A quadratic trinomial with leading coefficient different from 1 looks like

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

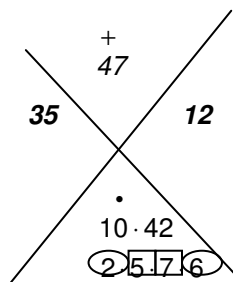
To factor such a trinomial using the bottoms – up method:

- Find two numbers that multiply to ac and that add up to the middle coefficient b .
- Divide these two numbers by a .
- Reduce the resulting fractions.
- Do bottoms – up.

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.

Divide 35 and 12 by 10 to get the fractions $\frac{35}{10}$ and $\frac{12}{10}$.

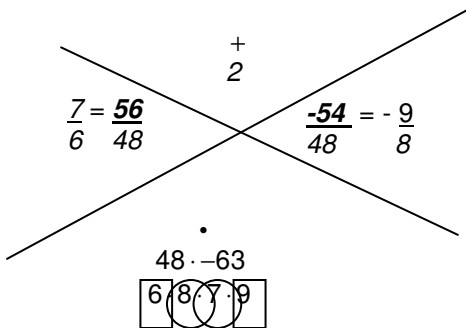
Reduce $\frac{35}{10}$ and $\frac{12}{10}$ to $\frac{7}{2}$ and $\frac{6}{5}$.

The fraction $\frac{7}{2}$ gives the factor $2x + 7$ (the “bottom” 2 became the coefficient of x).

The fraction $\frac{6}{5}$ gives the factor $5x + 6$ (the “bottom” 5 became the coefficient of x).

Thus, the factored form of $10x^2 + 47x + 42$ is $(2x + 7)(5x + 6)$.

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



⇒ The factored form of $48x^2 + 2x - 63$ is $(6x + 7)(8x - 9)$.

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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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