

## 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

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

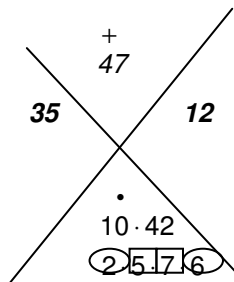
To factor such a trinomial using the bottoms – up method:

- 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  $\boxed{12}$  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  $\frac{12}{10}$ .

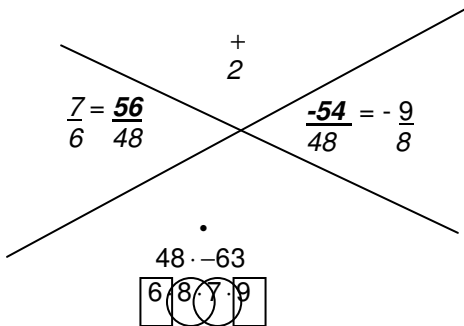
Reduce  $\frac{35}{10}$  and  $\frac{12}{10}$  to  $\frac{7}{2}$  and  $\frac{6}{5}$ .

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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***ac* – Method: BOTTOMS – UP**

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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***ac* – Method: BOTTOMS – UP**

**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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