Factoring Trinomials When a and c Are Not Prime

The main challenge in factoring is recovering the information that was lost when the middle terms were collected:

$$ax^2 + b_1 x + b_2 x + c \quad = \quad ax^2 + bx + c$$

When a and c are prime numbers this is easy (there are very few possibilities):

$3x^2 - 16x + 5$ = (   ) (   )   Check:

When a and c are not prime numbers there will be many more possible factors. In order to overcome this challenge we will require more efficient method(s).

Method of inspection – consider the information provided by $ax^2 + bx + c$

- if c is positive: __ x^2 + __ x + __ = (__ + __) (__ + __)

  __ x^2 − __ x + __ = (__ − __) (__ − __)

Example – Factor the following trinomial and then compare $(a)(c)$ to $(b_1)(b_2)$.

$8x^2 - 42x + 10$ Check

- if c is negative: $\_\_\ x^2 + \_\_\ x - \_\_ = (\_\_ + \_\_)(\_\_ - \_\_)$

  $\_\_\ x^2 - \_\_\ x - \_\_ = (\_\_ + \_\_)(\_\_ - \_\_)$

Example – Factor the following trinomials and then compare $(a)(c)$ to $(b_1)(b_2)$.

$6x^2 - 19x - 20$ Check

$12x^2 + 8x - 15$ Check

$4x^2 - 81$ Check

Homework – Please complete: Questions # 2bf, 3def, 4d, 7abef, 17a on page 246

Questions #1, 20ad on page 253.