

# Factoring Non-monic Trinomials: $ax^2 + bx + c$ where $a \neq 1$

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Math 222

Name: \_\_\_\_\_

Show all relevant work!

1. Start by multiplying these non-monic binomials. How does the middle term of the answer relate to the binomials?

$$(2x + 3)(x + 2)$$

$$(3x - 4)(2x + 3)$$

2. Factor using a box.

(a)  $2x^2 + 4x - 3x - 6$

(b)  $3t^2 - 21t + 5t - 35$

Instead of guessing and checking, you can get straight to the answer by following these steps.

1. Multiply the lead coefficient "a" by the constant term "c".
2. Find two numbers  $m, n$  that add to the middle coefficient "b" and multiply to " $a \cdot c$ ".
3. Write the middle term  $bx$  as  $mx + nx$  so the entire problem now looks like  $ax^2 + mx + nx + c$
4. Factor by grouping.

3. Factor by splitting and grouping.

$$7x^2 + 41x + 30$$

4. Factor by splitting and grouping in order to solve the equation.

(a)  $3x^2 - 32x = -45$

(b)  $8z^2 = -6z + 9$