

Notes: Factoring by Grouping AND Trinomials

The process of grouping is used because our original problem is a polynomial that has four terms. We group them into two and two.

* Your final answer will be "The GCF's and ONE matching SET"

Example 1: $(\frac{7x^3}{7x^2} + \frac{14x^2}{7x}) + 3x + 6$
 $7x^2(x+2) + 3(x+2)$
 $(7x^2+3)(x+2)$

* What is the GCF of the first group??

Example 2: $(2x^3 - 8x^2) + 5x - 20$
 $2x^2(x-4) + 5(x-4)$
 $(2x^2+5)(x-4)$

You Try!!

Example 3: $(x^3 - 6x^2) + 4x - 24$
 $1x^2(x-6) + 4(x-6)$
 $(x^2+4)(x-6)$

Example 4: $(9x^3 + 3x^2) - \frac{15x}{5} - \frac{5}{5}$
 $3x^2(3x+1) - 5(3x+1)$
 $(3x^2-5)(3x+1)$

SO... How can we use the process of grouping to solve our more difficult trinomials?

Example 1:

Start with: $4x^2 - 3x - 10$

We still need our t-chart:

Multiplies: A times C	Adds: B
-40	-3

$(4x^2 - 8x) + (5x - 10)$
 $4x(x-2) + 5(x-2)$

Then use grouping!!

$(4x+5)(x-2)$ TADA!
 ☺

1 · 40	
2 · 20	
4 · 10	
5 · 8	-8 · 5

Example 2: $3x^2 - 2x - 8$

Multiplies: A times C	Adds: B
-24	-2

$(3x^2 - 6x) + (4x - 8)$
 $3x(x-2) + 4(x-2)$

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

1 · 24	
2 · 12	
3 · 8	
6 · 4	-6 4

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You Try!!

#3 $12x^2 + 11x + 2$

$$\begin{aligned} & \swarrow \searrow \\ & (12x^2 + 8x)(3x + 2) \\ & 4x(3x + 2) \quad 1(3x + 2) \\ & \boxed{(4x + 1)(3x + 2)} \end{aligned}$$

#4 $9x^2 + 12x + 4$

$$\begin{aligned} & \swarrow \searrow \\ & (9x^2 + 6x) + (6x + 4) \\ & 3x(3x + 2) \quad 2(3x + 2) \\ & \boxed{(3x + 2)(3x + 2)} \rightarrow \boxed{(3x + 2)^2} \end{aligned}$$

#5 $6x^2 - 13x - 5$

$$\begin{aligned} & \swarrow \searrow \\ & (6x^2 - 15x) + (2x - 5) \\ & 3x(2x - 5) \quad 1(2x - 5) \end{aligned}$$

#6 $3x^2 - 8x + 4$

#7 $5x^2 + 19x + 12$

24	11
8 · 3	

$$\begin{aligned} & (12x^2 + 3x) \quad 8x + 2 \\ & 3x(4x + 1) \quad 2(4x + 1) \end{aligned}$$

$$\boxed{(3x + 2)(4x + 1)}$$

a · c	b
36	12

$$\begin{aligned} & 36 \cdot 1 \\ & 18 \cdot 2 \\ & \textcircled{6 \cdot 6} \end{aligned}$$

$$\boxed{(3x + 2)^2}$$

-30	-13
1 · 30	
2 · 15	
3 · 10	
5 · 6	

$$\begin{aligned} & \textcircled{2 \cdot 15} \quad \underline{-15} \quad \underline{+2} \end{aligned}$$

$$\boxed{(3x + 1)(2x - 5)}$$