

Factoring: $a > 1$

If you have a quadratic trinomial ($ax^2 + bx + c$) and there is no GCF AND $a > 1$

Then you will need to make the trinomial a POLYNOMIAL and use the grouping method.

Example 1

$$4x^2 - 11x - 3$$

$$\begin{array}{r} \downarrow \downarrow \\ 4x^2 - 12x + x - 3 \\ (4x^2 - 12x)(x - 3) \\ \hline 4x \quad 4x \\ 4x(x-3) + 1(x-3) \end{array}$$

$$4x(x-3) + 1(x-3)$$

$$(4x+1)(x-3)$$

NO GCF. MAKE THE TRINOMIAL A POLYNOMIAL.

1) WHAT MULTIPLIES TO GET -12 AND ADDS TO GET -11 ?
 $(1, 12)$ -12 AND 1
 $2, 6$
 $3, 4$

2) SPLIT UP MIDDLE TERM INTO $-12x$ AND $1x$

3) NOW GROUP!
 NO GCF SO USE 1

COMES FROM $4 \cdot -3$

Example 2

$$10x^2 + 19x + 6$$

$$\begin{array}{r} \wedge \\ 10x^2 + 4x + 15x + 6 \\ (10x^2 + 4x)(15x + 6) \\ \hline 2x \quad 2x \quad 3 \quad 3 \end{array}$$

$$2x(5x+2) + 3(5x+2)$$

$$(2x+3)(5x+2)$$

WHAT MULTIPLIES TO GET $(10 \cdot 6) = 60$ AND ADDS TO GET 19?

$1, 60$
 $2, 30$
 $3, 20$

$(4, 15)$ $4 + 15$

$5, 12$
 $6, 10$

Compare $a=1$ and $a > 1$

$$a=1 \\ x^2 - 2x - 15$$

$$(x-3)(x+5)$$

NO GROUPING NEEDED!
 WHAT MULTIPLIES TO GET -15 AND ADDS TO GET -2 ?
 $1, 15$
 $3, 5$
 $-3 + 5$

$$a > 1 \\ 2x^2 - 7x - 15$$

$$\begin{array}{r} \wedge \\ (2x^2 - 3x)(10x - 15) \\ \hline x(ax-3) 5c(ax-3) \end{array}$$

$$(x+5)(2x-3)$$

GROUPING NEEDED!
 WHAT MULTIPLIES TO GET -30 AND ADDS TO GET -7 ?
 $1, 30$
 $2, 15$
 $(3, 10)$ $-3 + 10$
 $5, 6$