

# 12.3 – FACTORING POLYNOMIALS

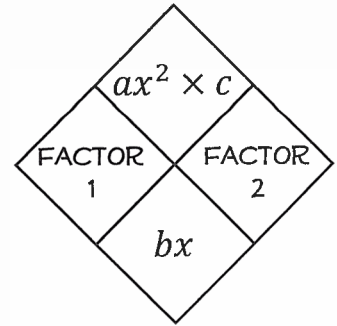
THE BOX METHOD ONLY WORKS IF YOU HAVE FACTORED OUT ANY COMMON FACTORS FIRST!

❖ Factoring Trinomials:  $ax^2 + bx + c$

## ➤ THE BOX METHOD

1. Multiply the first and last terms:  $ax^2 \times c$
2. Find the factors that multiply to be the product (in step 1) and that add to be the middle term:  $bx$

Organize this information with an X-box →



3. Draw a  $2 \times 2$  square
4. Put the first term of the trinomial  $ax^2$  in the upper-left corner and the constant term,  $c$ , in the lower-right corner.
5. Put the factors (from step 2) in the two remaining squares.
6. Find the GCF of each row & each column
7. Write the result as a product of two binomials.

$ax^2$	FACTOR 1	GCF of row 1
FACTOR 2	$c$	GCF of row 2
GCF of column 1	GCF of column 2	

Examples:

1.  $x^2 + 9x + 20$

2.  $d^2 + 5d - 6$

3.  $w^2 - 10w + 16$

4.  $n^2 + 5n - 24$

Notes: Lessons 12.3 – Factoring Polynomials

Examples for Day 2:

5.  $-20 + 9b - b^2 \rightarrow -b^2 + 9b - 20$  6.  $4x^3 + 22x^2 + 24x$

Common factor  $\rightarrow -1(b^2 - 9b + 20)$

C.f.  $2x(2x^2 + 11x + 12)$

$20b^2$	$b^2$	$-5b$	GCF $b$
$-5b$	$-4b$	$-4b$	$-4$
$-9b$	GCF $b$	$-5$	

$24x^2$	$2x^2$	$8x$	GCF $2x$
$8x$	$3x$	$3x$	$12$
$11x$	GCF $x$	$4$	

$\rightarrow -1(b-4)(b-5)$

C.f.  $2x(2x+3)(x+4)$

7.  $2w^2 - 3w - 5$

$-10w^2$	$2w^2$	$-5w$	GCF $w$
$-5w$	$2w$	$2w$	$-5$
$-3w$	GCF $2w$	$-5$	

$(w+1)(2w-5)$

8.  $3m^2 - 8m - 3$

$-9m^2$	$3m^2$	$-9m$	GCF $3m$
$-9m$	$1m$	$1m$	$-3$
$-8m$	GCF $m$	$-3$	

$(3m+1)(m-3)$