4.2 Mulitplying Binomials & Factoring by Grouping

A. Multiplying Two Binomials using Box Method

1. $(x+y)(a+b)$

$= ax + bx + ay + by$

	a	b
x	ax	bx
y	ay	by

2. $(x+2)(y-3)$

$= xy + 2y - 3x - 6$

	y	-3
x	xy	-3x
2	2y	-6

3. $(3x-4)(5y+z)$

$= 15xy + 3xz - 20y - 4z$

	5y	z
3x	15xy	3xz
-4	-20y	-4z

4. $(2x^2y-1)(3xy+7)$

$= 6x^3y^2 - 3xy + 14x^2y - 7$

	$2x^2y$	-1
3xy	$6x^3y^2$	-3xy
7	$14x^2y$	-7

5. $(2-x)(7+3y)$

$= 14 + 6y - 7x - 3xy$

	7	3y
2	14	6y
-x	-7x	-3xy

6. $(5x-3w)(2j-3k)$

$= 10jx - 15kx - 6jw + 9kw$

7. $(2x^5y^3-3xy^3)(x-2y)$

$= 2x^6y^3 - 4x^5y^4 - 3x^2y^3 + 6xy^4$

8. $(5a+2b)(4w-7k)$

$= 20aw - 35ak + 8bw - 14bk$

B. Factoring by Grouping

1. $ax + ay + bx + by$

$= (a+b)(x+y)$

	x	y
a	ax	ay
b	bx	by

2. $8x - 12xy - 6 + 9y$

$= (4x-3)(2-3y)$

	2	-3y
4x	8x	-12xy
-3	-6	9y

3. $xy - 7x - 3y + 21$

$= x(y-7) - 3(y-7)$

$= (y-7)(x-3)$

4. $4x^2y^3 - 2xy^2 + 6xy - 3$

$= (2xy^2+3)(2xy-1)$

	2xy	-1
$2xy^2$	$4x^2y^3$	$-2xy^2$
3	6xy	-3

5. $3(4x-1) + 5y(4x-1)$

$= (4x-1)(3+5y)$

6. $2(x^2+x+1) - 5y(x^2+x+1)$

$= (x^2+x+1)(2-5y)$

7. $4ax - 3by + 2bx - 6ay$

$= 4ax + 2bx - 3by - 6ay$

$= 2x(2a+b) - 3y(b+2a)$

$= 2x(2a+b) - 3y(2a+b)$

$= (2a+b)(2x-3y)$

8. $10x^4y^2 - 5x^2y + 4x^2y - 2$

$= 5x^2y(2x^2y-1) + 2(2x^2y-1)$

$= (2x^2y-1)(5x^2y+2)$

9. $15vx - 6vy + 5wx - 2wy$

$= (5x-2y)(3v+w)$

	5x	-2y
3v	15vx	-6vy
w	5wx	-2wy

10. $2x^2y - 3xy + 4y - 4x^2 + 6x - 8$

$= (y-2)(2x^2-3x+4)$

	$2x^2$	-3x	4
y	$2x^2y$	-3xy	4y
-2	$-4x^2$	6x	-8

Homework

Set 1: Handout #1bdf, 2ace, 3abcdef

Set 2: Handout #2abcdef, 4abcdef