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	xa	xb
y	ya	yb

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

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

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

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

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

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

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

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

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

$= 10xj - 15xk - 6wj + 9wk$

	$2j$	$-3k$
$5x$	$10xj$	$-15xk$
$-3w$	$-6wj$	$9wk$

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

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

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

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

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

	$4w$	$-7k$
$5a$	$20aw$	$-35ak$
$2b$	$8bw$	$-14bk$

B. Factoring by Grouping

1. $ax + ay + bx + by$

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

	x	y
a	ax	ay
b	bx	by

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

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

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

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

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

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

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

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

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

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

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

	$4x$	-1
3		
$5y$		

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

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

	x^2	x	1
2			
$-5y$			

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

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

	$2a$	b
$2x$	$4ax$	$2bx$
$-3y$	$-6ay$	$-3by$

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

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

	$5x^2y$	2
$2x^2y$	$10x^4y^2$	$4x^2y$
-1	$-5x^2y$	-2

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

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

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

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

	x	3
y	xy	$3y$
-4	$-4x$	-12

$= xy + 3y - 4x - 12$

Non-Box Method

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

$= xy - 4x + 3y - 12$

#4 a) $10xy + 5x - 4y - 2$

Non-Box Method

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

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

Homework

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

Set 2: Handout #2abcdef, 4abcdef