4.1 Multiplying & Common Factors

A. Multiplying Numbers using Box Method

1. $(7)(28)$

$= 7(20+8)$

	20	8
7	140	56

$= 140+56$
$= 196$

2. $(5)(-42)$

	-40	-2
5	-200	-10

$= -210$

3. $(-4)(-38)$

	-30	-8
-4	120	32

$= 152$

4. $(21)(35)$

	30	5
20	600	100
1	30	5

$= 600+100+30+5$
$= 735$

5. $(-17)(51)$

	-10	-7
50	-500	-350
1	-10	-7

$= -500-350-10-7$
$= -867$

6. $(-42)(-25)$

	-20	-5
-40	800	200
-2	40	10

$= 800+200+40+10$
$= 1050$

B. Factoring Numbers Using Box Method

*fill in the missing values to determine the factors of each number**

1. 252

$= (6)(42)$ (252 ÷ 6)

	40	2
6	240	12

2. 576

$= (8)(72)$ (576 ÷ 8)

	?	?
8	560	16

3. 168

$= (3)(18)$

	?	?
3	150	18

4. 322

$= (14)(\quad)$

	?	?
10	200	?
4	?	12

5. 903

$= (43)(\quad)$

	?	?
40	?	40
3	60	?

6. 522

$= (18)(\quad)$

	?	?
10	?	?
8	?	72

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C. Multiplying Algebraic Expressions using Box Method

1. $3(x+2)$

3	x	2
	$3x$	6

$= 3x+6$

2. $-2(3x-1)$

-2	$3x$	-1
	$-6x$	2

$= -6x+2$

3. $4x(3x-5)$

$4x$	$3x$	-5
	$12x^2$	$-20x$

$= 12x^2-20x$

4. $5x(3x^2-2x-1)$

$5x$	$3x^2$	$-2x$	-1
	$15x^3$	$-10x^2$	$-5x$

$= 15x^3-10x^2-5x$

5. $-3(4x^5-3x^2y+4)$

-3	$4x^5$	$-3x^2y$	4
	$-12x^5$	$9x^2y$	-12

$= -12x^5+9x^2y-12$

6. $-2x^3y(5x-2y+3)$

$-2x^3y$	$5x$	$-2y$	3
	$-10x^4y$	$4x^3y^2$	$-6x^3y$

$= -10x^4y+4x^3y^2-6x^3y$

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

$3x^2y^4z$	$2x$	$-3y$	1
	$6x^3y^4z$	$-9x^2y^5z$	$3x^2y^4z$

$= 6x^3y^4z-9x^2y^5z+3x^2y^4z$

D. Factoring Algebraic Expressions using Box Method

GCF = greatest common factor

When we factor algebraic expressions we are dividing out the GCF

Recall: Determine the GCF of each set of expressions.

$4,8,12$ → 4

$9x,27x,18x$ → $9x$

$2x^3,10x^2,12x^5$ → $2x^2$

$5x^5y^2,-25x^3y^2,15x^4y^2$ → $5x^3y^2$

Factor each expression by removing the GCF.

1. $5x+10$

	x	2
5	$5x$	10

GCF $= 5(x+2)$

2. $-4x-12$

	x	3
-4	$-4x$	-12

$= -4(x+3)$

3. $5x^3-15x^5y$

	1	$-3x^2y$
$5x^3$	$5x^3$	$-15x^5y$

$= 5x^3(1-3x^2y)$

4. $3x^3+2x^2-x$

	$3x^2$	$2x$	-1
x	$3x^3$	$2x^2$	$-x$

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

5. $12x^2-10x+4$

	$6x^2$	$-5x$	2
2	$12x^2$	$-10x$	4

$= 2(6x^2-5x+2)$

6. $2x^3-8x^2-6x$

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

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

7. $2z^2-3z-2xz$

$= z(2z-3-2x)$

	$2z$	-3	$-2x$
z	$2z^2$	$-3z$	$-2xz$

8. $4x^3-12x^2+8x$

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

	x^2	$-3x$	2
$4x$	$4x^3$	$-12x^2$	$8x$

9. $3x^3y^2-x^2y^2+4xy^3$

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

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

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Homework!

Set 1:

p.208 #3ab,4ef,6
p.234 #1ace,2,3,7a

Set 2:

p.208 #4ef,6
p.234 #4,7cd,10,13a,15a

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