

## Notes 9-3

### Multiplying Binomials

**Ex. 1:** Simplify the product  $(5m+2)(8m-1) =$

$$5m(8m-1) + 2(8m-1) =$$

$$40m^2 - 5m + 16m - 2 = \boxed{40m^2 + 11m - 2}$$

\*\*We will not use FOIL as a short cut to multiply binomials as it says in the book. It only works for binomial times a binomial. A better method is the box method.

**Ex. 2:**

a)

Multiply  $(2x+3)(-3x-7)$

	$2x$	$+3$	
Put your factors on the outside and your products on the inside.	$-3x$	$-6x^2$	$-9x$
	$-7$	$-14x$	$-21$
		$-6x^2$	$-23x$
			$-21$

Combine like terms. They will normally line up on the diagonal.

b) Multiply, using the box method,  $(3x+4)(2x+5)$ .

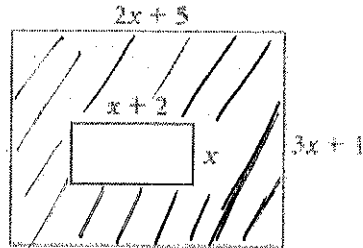
	$3x$	$+4$
$2x$	$6x^2$	$8x$
$+5$	$15x$	$20$

$$\boxed{6x^2 + 23x + 20}$$

**Ex. 3:**

a)

Find the area of the shaded region. Simplify.



Inside rectangle:  $x(x + 2) = x^2 + 2x$

Outside rectangle:  $(2x + 5)(3x + 1) = 6x^2 + 17x + 5$

	$2x$	$+5$
$3x$	$6x^2$	$15x$
$+1$	$2x$	$5$

Subtract outside rectangle -- inside rectangle.

$$(6x^2 + 17x + 5) - (x^2 + 2x) =$$

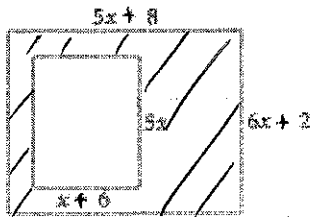
$$(6x^2 + 17x + 5) + (-x^2 - 2x) =$$

\*subtract polynomials

$5x^2 + 15x + 5$
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b)

Find the area of each shaded region. Simplify.



$$5x(x+6) = 5x^2 + 30x \quad \text{inside } \square$$

	5x	+8	
6x	$30x^2$	$48x$	
+2	$10x$	$16$	

outside  $\square$

$$30x^2 + 58x + 16$$

$$(30x^2 + 58x + 16) - (5x^2 + 30x) =$$

$$(30x^2 + 58x + 16) + (-5x^2 - 30x) =$$

$$\boxed{25x^2 + 28x + 16}$$

**Ex. 4:**

a)

Multiplying binomials and trinomials also works with distributive property.

For  $(6n^2 + 7)(n + 7)$

on  $2n^2$  and  $6n \cdot n$  and  $6n \cdot 7$   
 $12n^3 + 6n^2 + 42n$

on  $7n^2$  and  $7n$  and  $7 \cdot 7$   
 $7n^2 + 7n + 49$

Combine like terms to get  
 $12n^3 + 13n^2 + 49n + 49$

Or you can

	$2n^2$	$+n$	$+7$
$6n$	$12n^3$	$6n^2$	$42n$
$7$	$7n^2$	$7n$	$49$

$12n^3 + 13n^2 + 49n + 49$

b) Simplify  ~~$(4x^2+x-6)(2x-3)$~~   $(4x^2+x-6)(2x-3)$

$$4x^2 \quad +x \quad -6$$

$2x$	$8x^3$	$2x^2$	$-12x$
$-3$	$-12x^2$	$-3x$	$+18$

$$8x^3 - 10x^2 - 15x + 18$$