Expand each.

1. $(b+3)(b+6)$

$b^2+9b+18$

2. $(4c+9)(3c+4)$

	$4c$	$+9$
$3c$	$12c^2$	$27c$
$+4$	$16c$	$+36$

$=12c^2+43c+36$

3. $(N-2)(N-5)$

$N^2-7N+10$

4. $(5k-7)(2k-3)$

	$5k$	-7
$2k$	$10k^2$	$-14k$
-3	$-15k$	$+21$

$=10k^2-29k+21$

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

x^2-x-20

6. $(2y+11)(4y-9)$

	$2y$	$+11$
$4y$	$8y^2$	$+44y$
-9	$-18y$	-99

$8y^2+26y-99$

1. $(b+3)(b+6) = b^2+9b+18$
2. $(4c+9)(3c+4) = 12c^2+43c+36$
3. $(N-2)(N-5) = N^2-7N+10$
4. $(5k-7)(2k-3) = 10k^2-29k+21$
5. $(x+4)(x-5) = x^2-x-20$
6. $(2y+11)(4y-9) = 8y^2+26y-99$

There is something about problems 1, 3, and 5 which allow us to "speed up" the expanding process.
For 1, 3, and 5 look at the original problem and then at the answer and see if you can find a method for getting the answer without doing as much work as for the other problems. Explain what you notice below.

If the coefficients of both variables are 1 then the middle term of the answer is the sum of the constants in each factor and the constant of the answer is the product of the constants in each factor.

Why can't you "speed up" the expanding process in problems 2, 4, and 6 like you can for problems 1, 3, 5?

The coefficients of the variables are NOT 1.

Speeding up the process:

Expand (w + 8)(w + 2) $w^2 + 10w + 16$

Expand (c - 4)(c + 3) $c^2 - c - 12$

when the leading coefficient of each variable is 1......

(A + 7)(A - 3) = $A^2 + 4A - 21$

The coefficient of the middle term is the sum of the constants in each factor and the constant of the answer is the product of the constants of each factor.

	A	$+7$
A		$+7A$
-3	$-3A$	

$-3A + 7A$

$-3 + 7$
$= +4$

$+4A$

Expand

(B - 10)(B - 3) = $B^2 - 13B + 30$

(Q + 15)(Q - 4) = $Q^2 + 11Q - 60$

Expand

(4 - C)(-2 + C)

Because the coefficient of C in the first parentheses is not 1 you must expand as usual.

	c	-2
$-c$	$-c^2$	$+2c$
$+4$	$4c$	-8

$-c^2 + 6c - 8$

Sec 9-4: Expanding Special Cases

Expand each. Notice what happens.

1. $(d + 7)(d - 7)$

$= d^2 - 49$

	d	$+7$
d	d^2	$+7d$
-7	$-7d$	-49

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

$w^2 - 25$

	w	$+5$
w	w^2	$+5w$
-5	$-5w$	-25

The difference of perfect squares

$(a + b)(a - b) \quad = a^2 - b^2$

Perfect Squares:
1
4
9
16
25
36
49
64
81
100...

$(x+8)(x-8)$

	x	$+8$
x	x^2	$+8x$
-8	$-8x$	-64

These are opposites so they cancel.

Expand each.

1. $(r - 13)(r + 13)$

$(r)^2 - (13)^2$

$= r^2 - 169$

2. $(t^3 + 1)(t^3 - 1)$

$(t^3)^2 - (1)^2$

$= t^6 - 1$

Expand each.

1. $(5w^2 + 6)(5w^2 - 6)$

$(5w^2)^2 - (6)^2$

$= 25w^4 - 36$

2. $(2c^3 - 7d^4)(2c^3 + 7d^4)$

$(2c^3)^2 - (7d^4)^2$

$= 4c^6 - 49d^8$