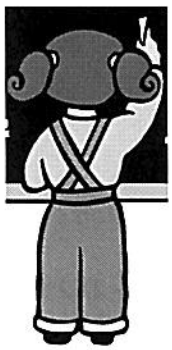
Essential Question: How do we multiply polynomials?

Do Now:
Jillian, a 4th grade student, is asked to find the product of 23 and 42.



She writes the following on the chalkboard.

$(20 + 3) \times (40 + 2)$

$800 + 40 + 120 + 6 = 966$

	40	2
20	800	40
3	120	6

Can you explain what she is doing?

Multiplying Binomials

Is it possible to use Jillian's method to multiply **(2x + 3)** and **(x + 5)**? yes !!

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

$2x^2 + 13x + 15$

Use the distributive property to check your work. Multiply each term of one polynomial by each term of the other polynomial.

$(2x^1 + 3)(x^1 + 5)$

$2x^2 + 10x + 3x + 15$

$2x^2 + 13x + 15$

Use the distributive property or a box diagram in order to multiply the binomials below.

* 1. $(x + 8)^2$

you cannot distribute a power over a + or - sign

$(x^1 + 8)(x^1 + 8)$

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

$x^2 + 16x + 64$

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

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

$3x^3 + 13x^2 - 10x$

Multiplying Polynomials

Jillian was asked the following day to multiply 342 by 23. She did so by writing the following.

$(300 + 40 + 2) \times (20 + 3)$

	300	40	2
20	6000	800	40
3	900	120	6

How does Jillian's process help us multiply the following polynomials?

4. $(3x^2 + 4x + 2)(2x + 3)$

	$3x^2$	$+4x^1$	$+2$
$2x^1$	$6x^3$	$+6x^2$	$+4x$
3	$9x^2$	$+12x$	$+6$

5. $(k^1 - 2)(k^2 - k^1 + 1)$

	k^2	$-k^1$	$+1$
k^1	k^3	$-k^2$	$+k$
-2	$-2k^2$	$2k$	-2

$k^3 - 3k^2 + 3k - 2$

6. $(2x^2 + 10x - 1)(x^2 - 6x + 1)$

	$2x^2$	$+10x^1$	-1
x^2	$2x^4$	$10x^3$	$-x^2$
$-6x^1$	$-12x^3$	$-60x^2$	$+6x$
1	$2x^2$	$10x$	-1

$2x^4 - 2x^3 - 59x^2 + 16x - 1$

7. Represent the product of 3 consecutive integers as a polynomial expression in simplest form. Let **x** represent the first integer.

Helpful Hint: *To represent consecutive integers algebraically, think about them numerically first. An example of a set of consecutive integers is 3, 4, 5.*

1st Integer: **x** *2nd Integer:* $x+1$ *3rd Integer:* $x+2$

remember to keep an answer of more than one term in ( )

$x^1(x^1+1)(x^1+2)$

$(x^2+x^1)(x^1+2)$

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

$x^3 + 3x^2 + 2x$

Today's Take Away...

In order to multiply polynomials, use the distributive Property.

Sometimes it's helpful to create a box diagram.