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)**?

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

(2x + 3)(x + 5)

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

1. $(x + 8)^2$

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

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

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

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

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:* _____   *3ʳᵈ Integer:* _____

Today's Take Away…

In order to multiply polynomials, use the _____ Property.

Sometimes it's helpful to create a_____ _____.

Perform the indicated operation.

1. $(10p^2 - 2p + 1) + (-5p^2 - 3p + 12)$

2. $(-d^2 + 19d - 8) - (-5d^2 - 6d + 12)$

3. $(6a^2b^5)(3ab)$

4. $2a^2(5a^3 + 3a^2 + 6a + 1)$

5. $(x - 5)^2$

6. $(3x^2 - 1)(2x + 5)$

7. $(3x - 4)(-2x^3 + 5x - 6)$

8. $(y^2 - 5y + 4)(y + 2)$

9. Tina has two brothers. One brother is seven years older than Tina and the other brother is four years younger than Tina. If Tina's age is represented by **x**, represent the product of all three of their ages as a polynomial expression _in simplest form_.
    Hint: Write expressions to represent the brothers' ages in terms of x.

     x = Tina's age

     _____ = older brother's age

     _____ = younger brother's age