

5.1b Multiplying Binomials (con.)

A **Polynomial** is:

Complete this table. Which ones are **Binomials**? What is a **Binomial**?

	# of terms	Type of Polynomial	
$5y^2$			
$4x + 3w^2$			
$63x^2y$			
$x^2 + 3x - 7$			
$x + 5$			
$5x^3 - 2x^2 + 11x - 9$			

Recall: The distributive property states $a(b+c) = \underline{\hspace{2cm}}$.

For example, $40(20+6) = (40)(20) + \underline{\hspace{2cm}}$. Usually we wouldn't do a question like this; we would just multiply $(40)(26)$ on a calculator to get the same answer.

However, in algebra we use the distributive property all the time.

For example, $3x(x+7) =$

How do we use the distributive property when multiplying two binomials?

One method is to use the distributive property numerous times; this is often referred to as **FOIL** when multiplying two binomials.

Try: $(2x-3)(3x+1)$

FOIL stands for:

Find the products for these:

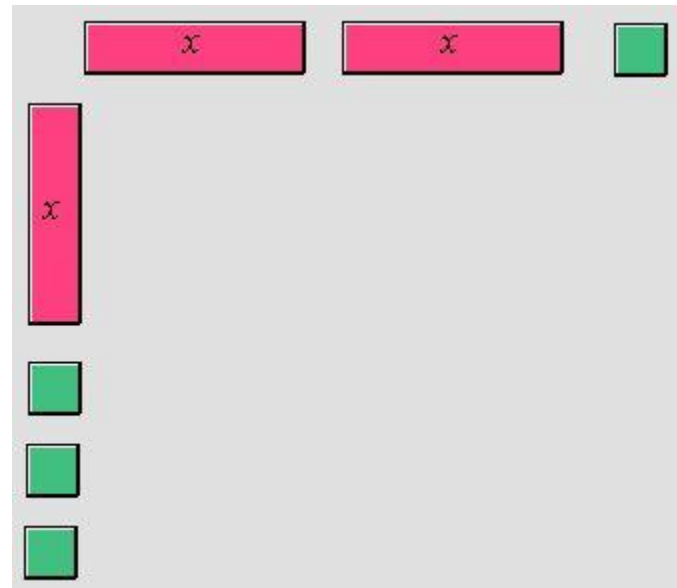
$(x+5)(x+3)$	$(x-3)(x-2)$
$(2x+5)(3x+1)$	$(2x-1)(3x-2)$

***There are other methods too, ask your math teacher if FOIL doesn't work for you.

Try these:

$(x-6)^2$	$(2x+7)^2$
-----------	------------

We can also use manipulatives, here is $(2x+1)(x+3)$. What is the product?



How can we multiply a trinomial and a binomial?
Try it using the distributive property or another method.

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

In these questions, FOIL is only part of our method. Simplify:

$$(x+1)(5x+3)+(3)(2x+4)(6x-2)$$

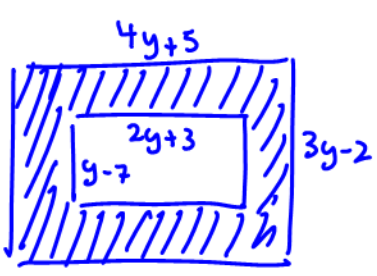
$$(3y-2)(4y+5) - (y-7)(2y+3)$$

$$(12y^2 + 7y - 10) - (2y^2 - 11y - 21)$$

optional $(12y^2 + 7y - 10) + (-2y^2 + 11y + 21)$

$$10y^2 + 18y + 11$$

	$3y$	-2
$4y$	$12y^2$	$-8y$
$+5$	$15y$	-10

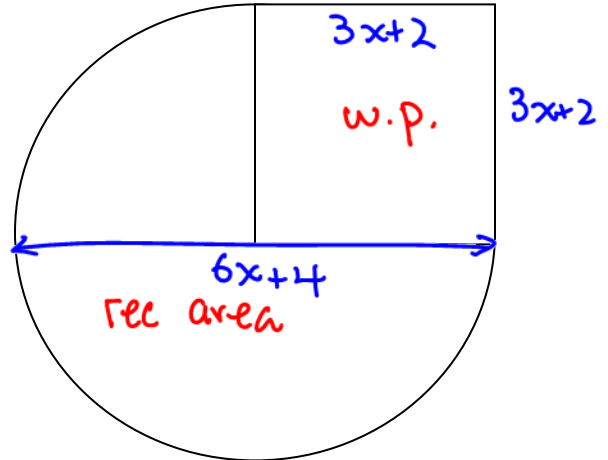


Application

Rowan is calculating the dimensions of a square water park within a larger, circular recreational area. As the recreational area increases in size, so does the water park.

What will the area of the water park be if the diameter of the circle is $6x+4$?

$$\begin{aligned} \text{water park} &= (3x+2)^2 \\ &= (3x+2)(3x+2) \\ &= \underline{\underline{9x^2 + 12x + 4}} \end{aligned}$$



rec area

$$\begin{aligned} A &= \frac{3}{4} \pi r^2 \\ &= \frac{3}{4} \pi (9x^2 + 12x + 4) \end{aligned}$$

$$\begin{aligned} \text{total area} &= \frac{3}{4} \pi (9x^2 + 12x + 4) + (9x^2 + 12x + 4) \\ &= \left(\frac{3}{4} \pi + 1 \right) (9x^2 + 12x + 4) \end{aligned}$$