Day 32: Factoring Trinomials

We have learned about changing from factored to standard form by multiplying two binomials. Today, we will learn about going backwards (changing from standard form to factored form) by **FACTORING.**

First, let's notice some patterns with multiplying…

1. Multiply these binomials out using any methods.

a. $(x + 2)(x + 3)$

	x	$+2$
x	x^2	$2x$
$+3$	$3x$	6

$= x^2 + 5x + 6$

b. $(x + 7)(x - 1)$

	x	$+7$
x	x^2	$7x$
-1	$-1x$	-7

$= x^2 + 6x - 7$

2. Standard form is $y = ax^2 + bx + c$. What do you notice about the numbers in the original problems in factored form in #1, compared to the numbers in the standard form after you multiplied them out?

Add to equal b, multiply to c

Summarize:

$(x + p)(x + q) = x^2 + bx + c$, where $p + q =$ b and $p \cdot q =$ c

We will use our understanding of these patterns you noticed above to change from standard to factored form now. We will use a method similar to the "area model" we used previously, but in reverse.

Factor the following expressions.

1. $x^2 + 10x + 16$

First, Put the "x^2" term in the upper left corner, "bx" term in the circle, and "c" term in the lower right corner. Your goal is to try to get factors that multiply to "x^2" and "c", and that add to "bx" (make sure you use a pencil in case you make mistakes).

	x	$+2$
x	x^2	$2x$
$+8$	$8x$	16

$10x$

optional

Factors of "c" (___)	Sum of factors
1 · 16	~~17~~
2 · 8	10
4 · 4	~~8~~

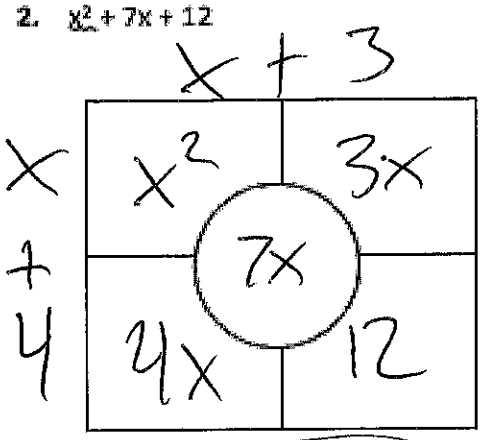
Check (by multiplying the factors):

$(x+2)(x+8)$

$x^2 + 8x + 2x + 16$

You try:

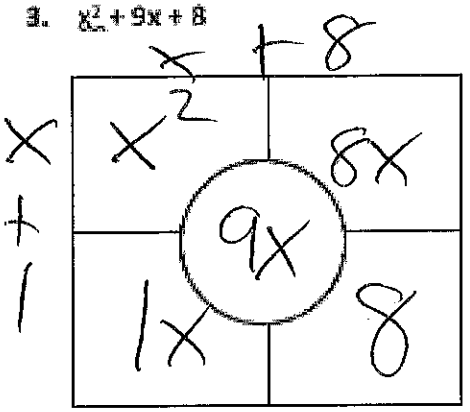
2. $x^2 + 7x + 12$



Check: $(x+3)(x+4)$

$x^2+3x+4x+12$

3. $x^2 + 9x + 8$

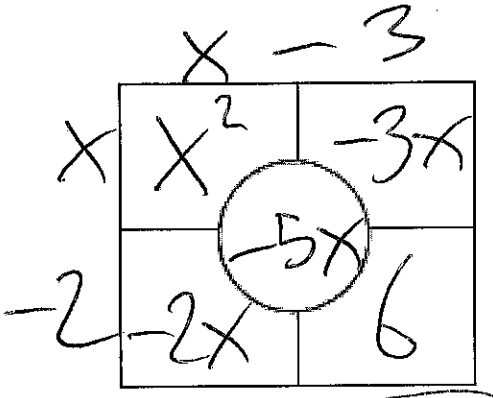


Check: $(x+1)(x+8)$

$x^2+1x+8x+8$

Now let's factor when "b" and/or "c" is negative.

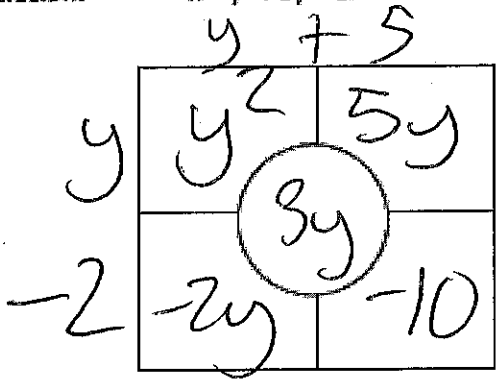
3. $x^2 - 5x + 6$ **Observations/Conclusion:**



Check: $(x-3)(x-2)$

$x^2-3x-2x+6$

4. $y^2 + 3y - 10$ **Observations/Conclusion:**

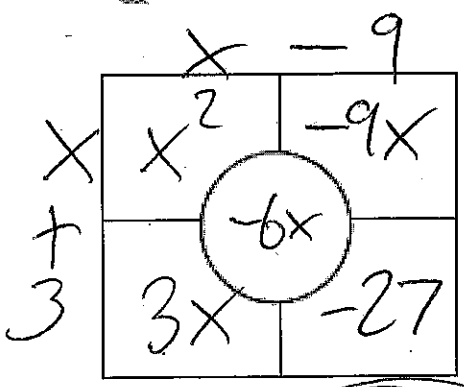


Check: $(y+5)(y-2)$

$y^2-2y+5y-10$

You try:

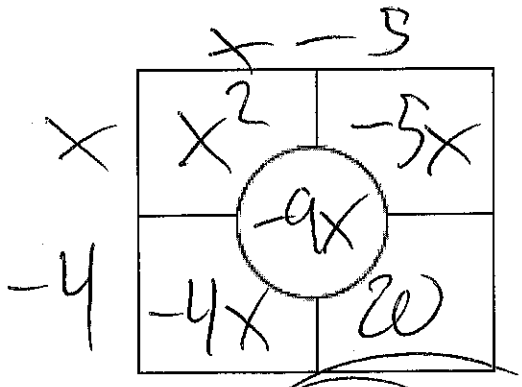
5. $x^2 - 6x - 27$



Check: $(x-9)(x+3)$

$x^2-9x+3x-27$

6. $x^2 - 9x + 20$



Check: $(x-5)(x-4)$

$x^2-5x-4x+20$