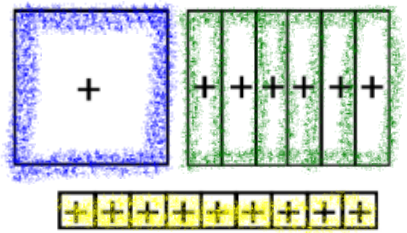
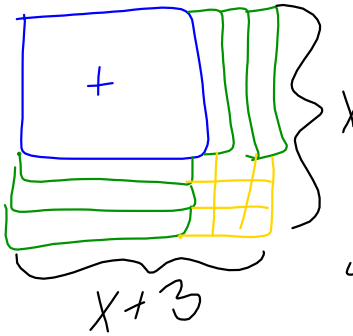
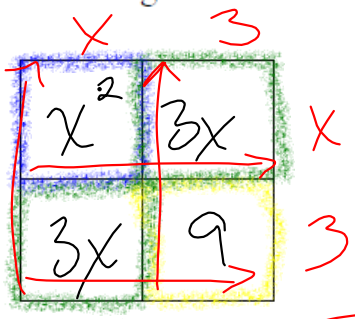
Name: Period: Date:

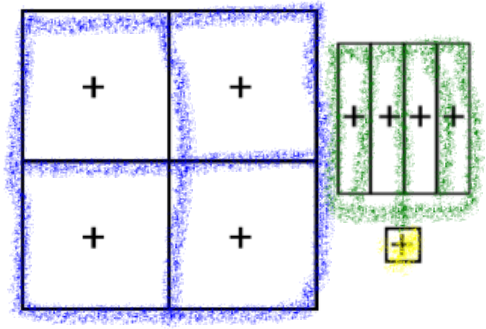
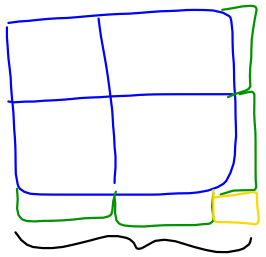
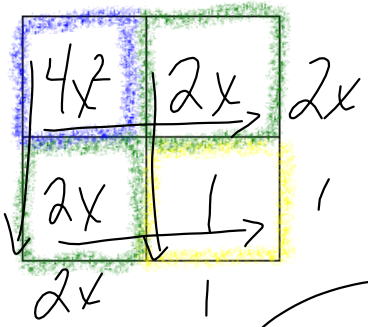
Math Lab: Factoring with Perfect Squares

Factoring Perfect Square Trinomials

Example A

Write the area as a sum.	Sketch the tiles as a rectangle and write the area as a product.	Factor using the box-method.
 $x^2 + 6x + 9$	 $x+3$ $x+3$ Square $(x+3)(x+3) = (x+3)^2$	 x^2 $3x$ $3x$ 9 x 3 x 3 9 3 3 6 $(x+3)^2$

Example B

Write the area as a sum.	Sketch the tiles as a rectangle and write the area as a product.	Factor using the box-method.
 $4x^2+4x+1$	 $2x+1$ $2x+1$ Square $(2x+1)^2$	 $4x^2$ $2x$ $2x$ $2x$ 1 1 $2x$ 1 $(2x+1)^2$ 4 2 2 4

These are examples of perfect square trinomials. If you recognize that a quadratic is a perfect square trinomial, you can use this short-cut to factor it rather than using the box-method.

Perfect Square Trinomial

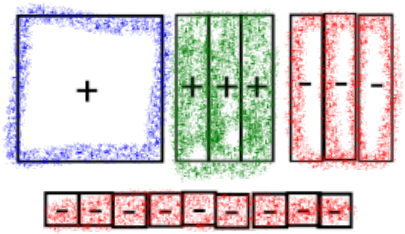
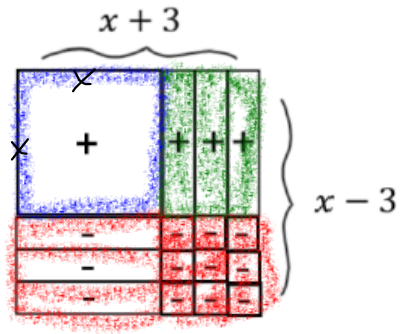
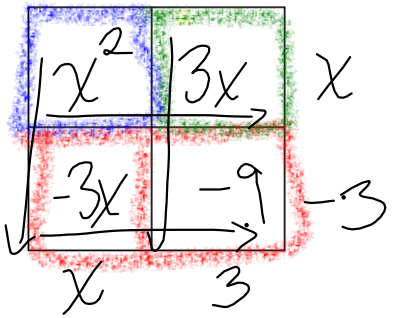
$$a^2 + 2ab + b^2 = (a + b)^2$$
$$a^2 - 2ab + b^2 = (a - b)^2$$

Determine if the quadratic is a perfect square trinomial. If so, factor it using the short-cut.

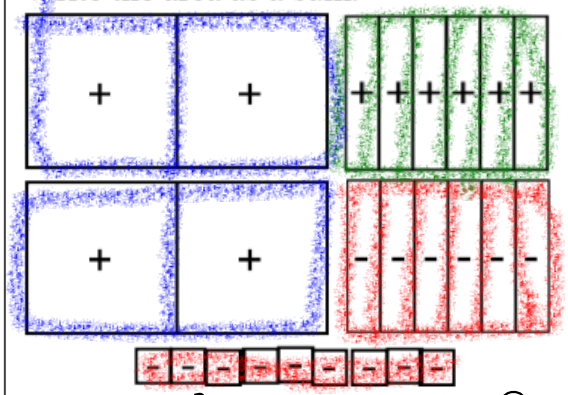
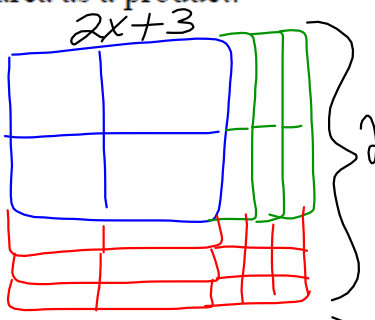
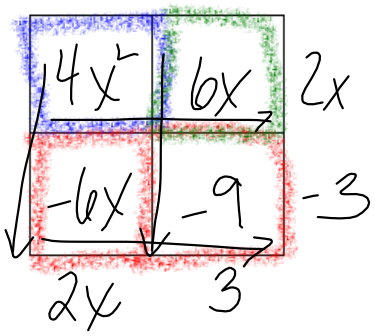
1] $x^2 + 12x + 36$ $(x + 6)^2$	2] $x^2 - 14x + 49$ $(x - 7)^2$	3] $9x^2 + 30x + 25$ $(3x + 5)^2$
4] ~~$4x^2 - 36x$~~ $+ 81$ $(2x - 9)^2$	5] $16x^2 + 8x + 1$ $(4x + 1)^2$	6] $25x^2 - 35x + 49$ $(5x - 7)^2$ Not a perfect Square trinomial

Difference of Squares

Example C

Write the area as a sum.	Sketch the tiles as a rectangle and write the area as a product.	Factor using the box-method.
		
$x^2+3x-3x-9$	$(x+3)(x-3)$ Square	$(x+3)(x-3)$
x^2-9		

Example D

Write the area as a sum.	Sketch the tiles as a rectangle and write the area as a product.	Factor using the box-method.
		

$4x^2 + 6x - 6x - 9$

$4x^2 - 9$

Difference of Squares

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

Square

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

-36

$6 \quad -6$

0

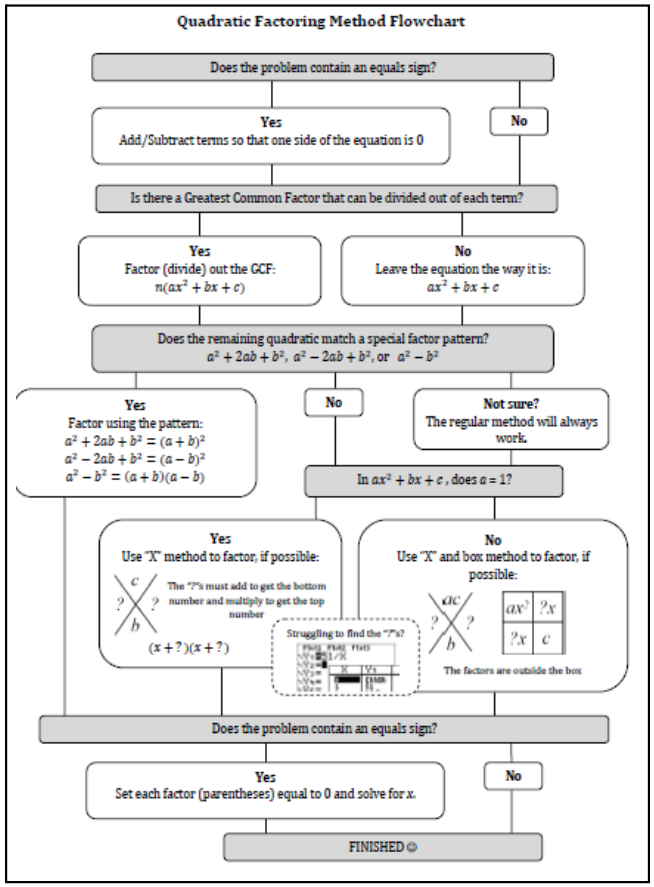
These are examples of a difference of squares binomial. If you recognize that a quadratic is a difference of squares, you can use this short-cut to factor it rather than using the box-method.

Difference of Squares

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

Determine if the quadratic is a difference of squares. If so, factor it using the short-cut.

7] $x^2 - 49$ $(x+7)(x-7)$	8] $25x^2 - 36$ $(5x-6)(5x+6)$	9] $x^2 + 16$ $x \quad 4$ DNF
10] $4x^2 - 81$ $(2x-9)(2x+9)$	11] $49x^2 + 64$ DNF	12] $100x^2 - 1$ $(10x+1)(10x-1)$



How do you factor to solve an equation?

$$10x^2 - 40x = 32 + 36x$$

$-32 \quad -32$

$$10x^2 - 40x - 32 = 36x$$

$-36x \quad -36x$

$$\frac{10x^2}{2} - \frac{76x}{2} - \frac{32}{2} = \frac{0}{2}$$

$$5x^2 - 38x - 16 = 0$$

-80, -40×2, -38

$5x^2$	$-40x$	$5x$
$2x$	-16	2
x	-8	

$(5x+2)(x-8)=0$

$5x + 2 = 0$

$-2 \quad -2$

$\frac{5x}{5} = \frac{-2}{5}$

$x = \frac{-2}{5}$

$x - 8 = 0$

$+8 \quad +8$

$x = 8$

On your whiteboard...

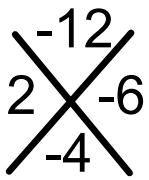
$$5x^2 - 2x - 6 = -3x^2 + 6x$$

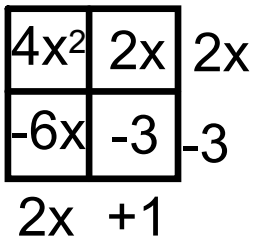
$+3x^2$ $-6x$ $+3x^2$ $-6x$

$8x^2-8x-6=0$

$2(4x^2-4x-3)=0$

$2(2x-3)(2x+1)=0$





$(2x-3)=0$ and $(2x+1)=0$

$x=3/2$ and $x = -1/2$