Tooele County Lesson Plan Template

Class: **Secondary Math 2**

Standard: N.CN.2: use the relation i^2=-1 and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers. A. REI.4 Solve quadratic equations in one variable. F.IF.8: Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. A.SSE.1: Interpret expressions that represent a quantity in terms of its context. A.SSE.2: Use structure of an expression to identify ways to rewrite it. A.SSE.3: Choose and produce an equivalent form of an expression to reveal and explain properties of the quanitity represented by the expression.

What do I want my students to learn and be able to do? Learning Objective in Student Friendly Language (Post in class for students to see.)

Factor quadratics with algebra tiles and algebraically without algebra tiles.

Tier 1 Instruction - Step by Step Procedure

10 minutes	Practice quizette day 4 - Properties of Exponents
5 minutes	Homework Q&A
15 minutes	Unit 1A Re-teach Multiplying Complex Numbers with Practice
2 minutes	Partner sharing - review zero product property
3 minutes	Partner sharing - review multiplying polynomials using area model
5 minutes	Algebra tile introduction and intro to factoring.
2 minutes	Area = product of dimensions
8 minutes	
	Factor quadratics using algebra tiles, sketch figures in notes, compare with partner
5 minutes	Look for patterns and relationships in constant and linear terms.
8 minutes	Factor quadratics using the area model and algebra tiles. Quick Poll!
3 minutes	Discuss: is the box necessary? Can you see a pattern without it?
4 minutes	Partner sharing - special case: difference of two squares (no linear term)
5 minutes	Discuss: What is the relationship (using area model) between standard form and factored form of a quadratic?
5 minutes	
	Put it all together - solving quadratics by factoring using zero product property
5 -10 minutes	Homework!

Key Vocabulary: Zero Product Property - AB=0, then A=0 or B=0
Factor - taking apart a number or expression into various parts that multiply to obtain the original.

Special Cases - when terms of the quadratic are missing. Difference of two squares

Considerations for Special Populations:

*Highlighting and color coding
*Algebra tile manipulatives

What will I do if they don't learn it? (Tier 2 & 3 interventions)

*Alternate (trick) method for factoring

*Continued use of algebra tiles

What explicit teaching strategies need to be emphasized?

* Partner sharing (think, pair, share)

*circular learning

*compare/contrast

What will I do if they already know it? (What additional challenges will I assign?)

Challenge students to factor quadratics with leading coefficients not equal to one using the same area model/box method.

How will you know that they learned the material?
Homework 1B.4
TI Nspire Quick Poll
Homework Quiz

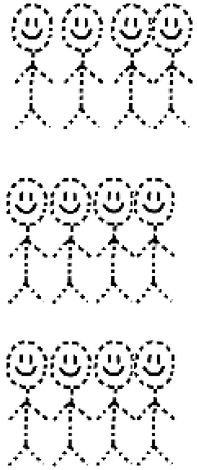
Resources/Materials Needed:
Calculators for quick poll
Algebra Tile set for each student
Homework 1B.4

Reflect on how the lesson was received by the students:

Unit 1A Reteach

Multiplying complex numbers.

- Multiplication is multiplication. And i behaves like x.



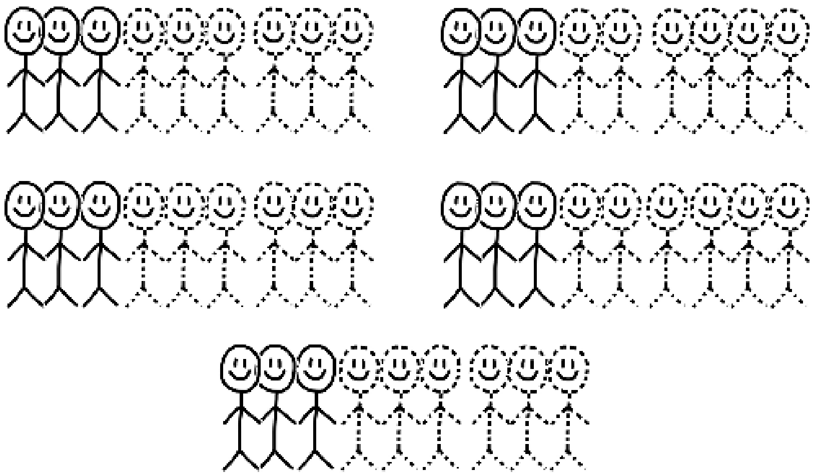
$3(4i)$

Unit 1A Reteach

Multiplying complex numbers.

- Multiplication is multiplication. And i behaves like x.

$5(3+5i)$



Unit 1A Reteach

Multiplying complex numbers.

Whenever i has an exponent, simplify it.

$$i^2 = -1$$

$(5)(3i)$

$(5i)(3i)$

Unit 1A Reteach

Multiplying complex numbers.

Whenever i has an exponent, simplify it.

$$i^2 = -1$$

$(5)(2+3i)$

$(5i)(2+3i)$

Practice

Simplify.

1) $7(-6i)$

2) $(4i)(8i)$

3) $(-i)(6+7i)$

4) $(8+7i)(-4+5i)$

1) $7(-6i)$

$-42i$

2) $(4i)(8i)$

-32

3) $(-i)(6+7i)$

$7-6i$

4) $(8+7i)(-4+5i)$

$-67+12i$

Unit 1B Polynomials

Objective:

Factor quadratics with algebra tiles

Look for patterns in the algebra tiles to factor quadratics algebraically.

Review: Zero Product Property

If $A \cdot B = 0$

Then $A = 0$ or $B = 0$

Practice:

$x(2x-3)=0$

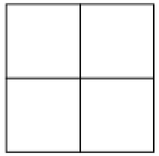
$(x+4)(x-3)=0$

Review: Multiplying Polynomials $(x+2)(x+1)$

Strategy 1: Distribute (PB&J Sandwich)

Strategy 2: F O I L

Strategy 3: Area Model

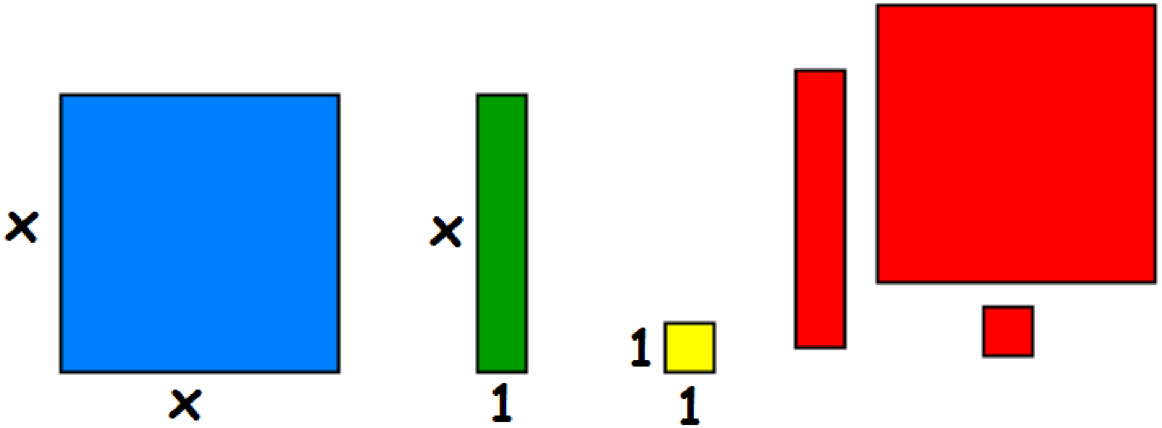


Use the area model and one other method to simplify the expression above. Show each step.

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

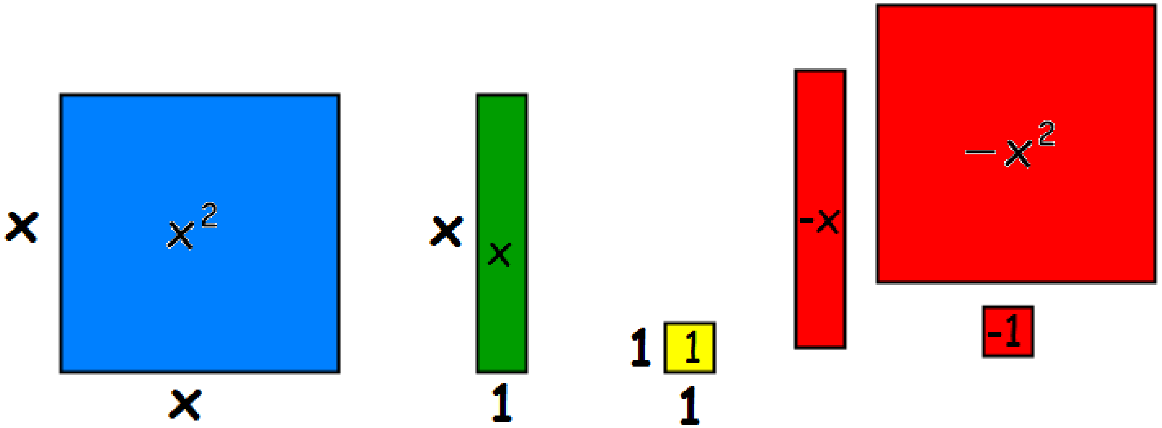
	x	2
x		
1		

Algebra Tiles



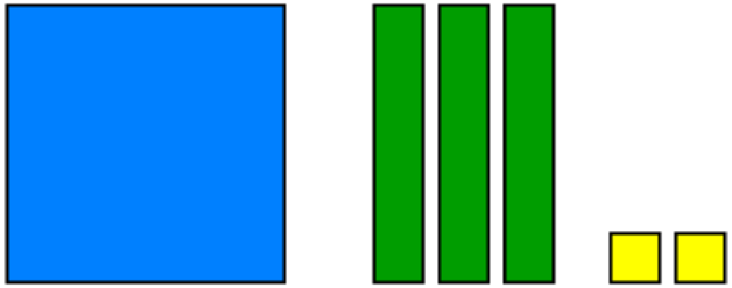
With the dimensions given above, what is the area of each tile?

Algebra Tiles



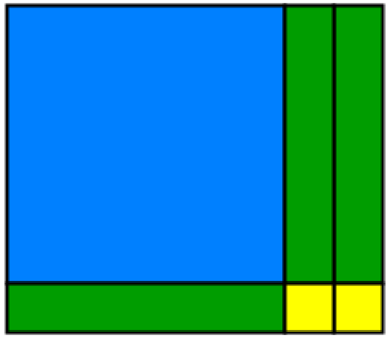
Sort your algebra tiles to represent $x^2 + 3x + 2$

Now rearrange them to form a perfect rectangle



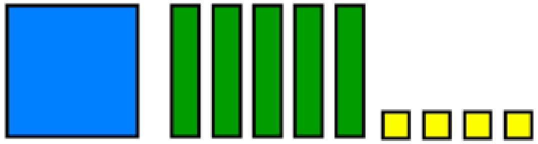
How long is each side?

What is the area?

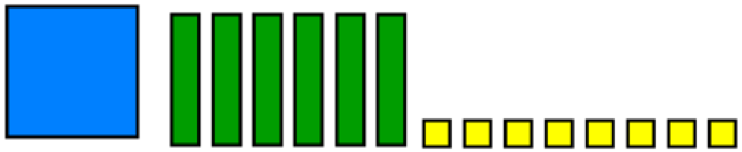


Use algebra tiles to factor the following quadratics:

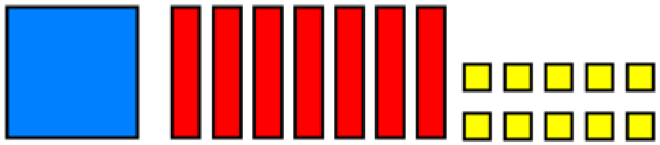
x^2+5x+4



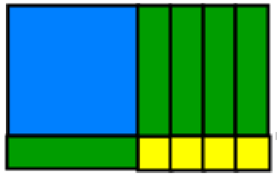
x^2+6x+8



$x^2-7x+10$

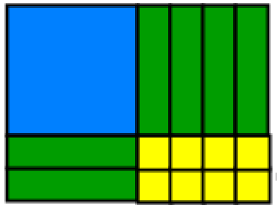


x^2+5x+4



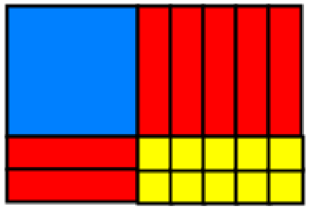
$(x+4)(x+1)$

x^2+6x+8



$(x+4)(x+2)$

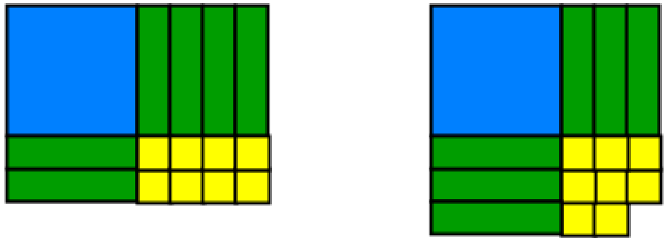
$x^2-7x+10$



$(x-5)(x-2)$

Relationships: constant and linear terms

Both arrangements represent the same area: $x^2 + 6x + 8$
but only one makes a perfect rectangle.

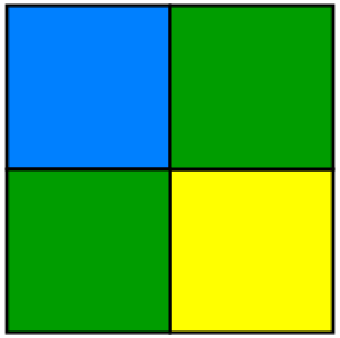


Why is the arrangement of the green rectangles important?

How does the arrangement of the green rectangles relate to the total number of yellow squares?

How do we do this without the algebra tiles?

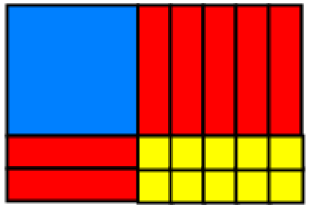
x^2+6x+8



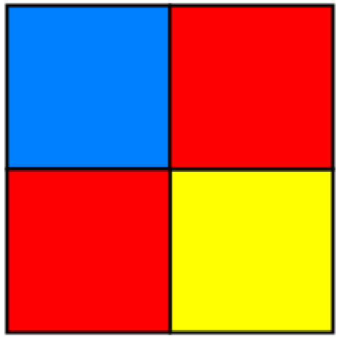
$(x+4)(x+2)$

Try this...

$x^2 - 7x + 10$



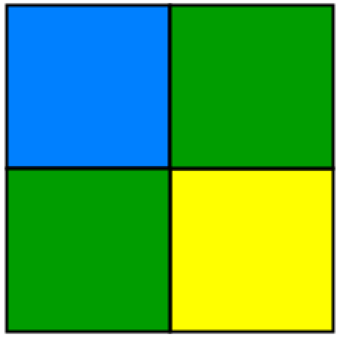
$(x-5)(x-2)$



Noticing more patterns

$x^2 + 12x + 32$

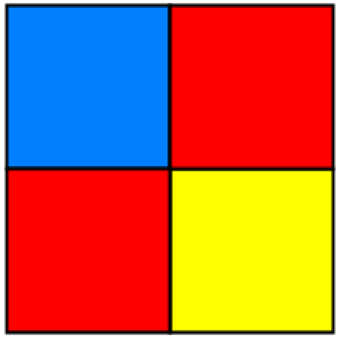
What are the factors of 32?



Which ones will add up to 12?

Noticing more patterns

$x^2 - 8x + 12$

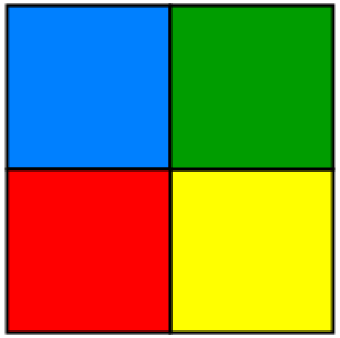


What are the factors of 12?

Which ones will add up to -8?

Noticing more patterns

$x^2+4x-12$

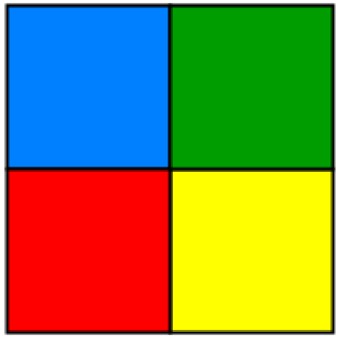


What are the factors of -12?

Which ones will add up to 4?

Noticing more patterns

$x^2 - 25$

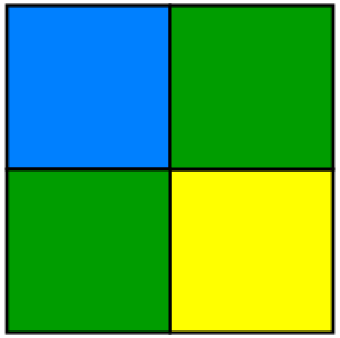


What are the factors of -25?

What should they add up to?

Think of the quadratic: x^2+6x+8

In factored form: $(x+4)(x+2)$



How are the two different forms related?

Where in the figure do you see each form?

How does factoring relate to the area model of multiplication?

Putting it all together...

Solve the equations

$$x^2+6x-16=0$$

$$x^2+10x+5=-16$$

Secondary Math 2 Name________________________________

1B.4 Factoring and Solving by Factoring

Date________________ Period____

Factor each completely.

1) $p^2 + 10p + 16$

2) $b^2 - 11b + 24$

3) $n^2 - 5n - 50$

4) $a^2 + 3a - 18$

5) $x^2 + 6x + 8$

6) $x^2 + 5x + 4$

7) $k^2 + k - 72$

8) $x^2 - 7x - 18$

9) $5n^2 + 30n + 25$

10) $5x^2 + 55x + 90$

11) $2m^2 + 4m$

12) $2b^2 + 20b + 42$

Solve each equation by factoring.

13) $(7v + 1)(v - 6) = 0$

14) $(b - 5)(b + 8) = 0$

15) $v^2 - 25 = 0$

16) $p^2 - 2p - 8 = 0$

17) $p^2 + 11p + 31 = 3$

18) $x^2 - 8x - 3 = -3$

19) $8p^2 - 16p - 277 = 3$

20) $5n^2 + 25n - 7 = -7$