Noyce MTF Algebra Lesson Study Group

Semester 1 Teaching – Learning Plan

December 2nd, 2014

Title of Lesson: Factoring Quadratic Trinomials

Research Theme:

For students to be able to communicate their ideas and use the critique of ideas as a way to improve their own understanding.

**Context of lesson (summary of prior and subsequent learning):**

Prior to this lesson, students have spent time learning how to add, subtract, multiply, and divide monomials. They have also spent considerable time on adding and subtracting polynomials, multiplying a monomials with a polynomial, factoring a monomial from a polynomial, and multiplying polynomials (with heavy emphasis on binomial multiplication). The content of this specific lesson will set students up for solving quadratics by factoring in the next unit and will be used again in Algebra 2.

**Relevant CCSS Mathematics Standards:**

**These were taken from the High School Algebra Standards under “Seeing Structure in Expressions”**

* + [CCSS.Math.Content.HSA-SSE.B.3](http://www.corestandards.org/Math/Content/HSA/SSE/B/3) Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.★
		- [CCSS.Math.Content.HSA-SSE.B.3a](http://www.corestandards.org/Math/Content/HSA/SSE/B/3/a) Factor a quadratic expression to reveal the zeros of the function it defines. [We are only doing the first part of B.3a]

**Relevant CCSS Mathematics Practices:**

#5 – Use appropriate tools strategically; #7 – Look for and make use of structure

**Lesson Plan**

*December 2nd, 2013*

*Guajome Park Academy*

*Classroom of Kellen Slack*

*Period 2*

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|  | **Student Learning Activities** | **Anticipated Student and Teacher Responses** | **Points to notice** |
| A | (5 min) Anticipatory/frontloaded warm up problem set |  S: Finds “solution” to expression.T: Where did the equal symbol come from? S: Combine unlike terms.T: “Are those like terms?” S: Multiplying first and last |  Are there “aha” moments at point of algorithm? |
| B | (10-15 min) Concept introduction set of reverse multiplication known as “factoring” | S: “reverse” or “going backwards” -> “isn’t that just dividing?”T: You can “unmultiply” 10 into 5\*2, we called it factoring. This is the same thing. S: Why do we need to do this.T: The ability to write something as an equivalent product will become very useful later. S: Is this right?T: Does it do what it’s supposed to do? (when multiplied back out) S: Signs |  During part B, where do students “start”? what is their intuition algorithm? |
| C | (10 min) Algorithm Instruction and Practice | S: Does it matter which one goes on the left or the right?T: Is 3 times 5 the same as 5 times 3? S: Does it matter which one is positive and which one is negative?T: Which one works? |  Do students understand how to verify accuracy? |
| D | (10 min) Practice set of mixed problems that may or may not require algorithm |  S: Student gets stuck NOT using the algorithmT: Hey Maverick, you wanna guess forever? Try the algorithm and see if you don’t like it more? >>Choice Metaphor<< S: Sign issuesT: Check the sum, check the multiplication S: Completely stuck (can’t find factor/sum match)T: Brute force factor pair list |  Do students understand what “unmultiply” means? |
| E | (20 min) “Generate 3 trinomials that you think do need the algorithm and 3 trinomials that you think don’t need the algorithm” |  S: “Algorithm” problems too easy S: “Algorithm” just messy numbers, not factorable S: No sense for how to generate S: “Intuition” too hard |  Observing variation in method choice during last section? |

***Corresponding problems:***

|  |  |
| --- | --- |
| A | 1. 3x(2x-5)2. 2. 4(2x-5)3. (3x+4)(2x-5)4. (3x+4)(2x+5)5. (3x-4)(2x-5) |
| B | Reverse sum to product x2 + 5x + 6Factor x2 +7x + 12 x2 +20+51Factor each sum(x+3)(x-7) = x2 -4x – 21(x+9)(x-2) = x2 +7x -18(x-20)(x-1) = x2 -21x – 20(2x+1)(x+3) = 2x2 + 7x + 3(4x-3)(5x+2) = 20x2 – 7x -6(2x + 3)(x-8) = 2x2 -13x - 24 |
| C | Algorithm instruction: 6x2 -x -15 |