**Learning Segment Plan**

Candidate: Michael A. Sorice

School: Villa Grove High School

Cooperating Teacher: Bryan Murawski

Subject: Mathematics, Integrated Math III

1. What period/hour will you teach the learning segment? Provide the beginning and ending class times.

Hour 4, 10:48-11:35.

1. What will be the overall topic of the learning segment?

The roots of polynomials, including the Remainder, Factor, and Rational Root Theorems; definition and nature of roots; relations among their aspects in different representations (zeros of polynomial function, roots of polynomial equation, factors of polynomial, and intercepts of graph of polynomial function); and Fundamental Theorem of Algebra.

1. Provide the learning segment’s purpose and central focus. (see edTPA)

This learning segment focuses on the roots of polynomials, understood through various representations of polynomials. The lessons will develop conceptual understanding of roots; techniques to find them and to evaluate, transform, or create polynomial representations using them; and connections to further topics, especially through the fundamental theorem of algebra.

The purpose of this learning is to deepen student understanding and fluency with functions in general and polynomial functions in particular. This segment serves as the cap to a unit on polynomials and will make use of technique and knowledge from previous lessons therein. The knowledge and understanding built here will be central to further work throughout mathematics, with the fundamental theorem of algebra in particular one of the central results of this level of mathematics. At the same time, the learning in this segment has a number of practical applications, with modeling using polynomials one of the most versatile applied techniques in mathematics.

4. Provide at least three behavioral objectives (ABCD) for the learning segment.

a. Given an polynomial with integer coefficients *P* and a monic linear *x – r* (C), the student (A) will evaluate *P*(*r*) using the Remainder Theorem (including by synthetic substitution) AND invoke the factor theorem to state whether *x – r* is a factor of *P* (B) in 80% of cases (D).

b. Given a polynomial with real coefficients(C), the student (A) will use the Fundamental Theorem of Algebra to its number of real roots (B) in 100% of cases (D).

c. Given a polynomial over the rationals (C), the student (A) will invoke the Rational Root Theorem to generate the set of candidate rational roots (B) with at most one omission, including ambiguous signs (D).

5. What will each day’s topic be?

Day 1: Division of polynomials revisited: factor and remainder theorems.

Day 2: Roots of polynomials, including fundamental theorem of algebra. (Optional: Review of real and complex number systems.)

Day 3: Rational root theorem and other considerations for finding rational roots.

Day 4: Consolidation, review, and/or re-teach.

Day 5: Unit test OR study day for unit test.

6. What instructional materials will you be using, adapting, or creating?  
In order to work within existing flipped class structure, my main materials will be several video tutorials, including direct conceptual instruction and modeling solution of problems from existing course notes. Some of these will be adapted from existing tutorials provided by textbook publisher, with an increased emphasis on connections to concept and application, while others will be created *de novo*. I will also use textbook-provided worksheets, practice test, and review problems to create the review lessons.

For continuity of practice, I will make extensive use of existing textbook problems and pre-existing test. This latter will be used not only for formal assessment, but also to target review, along with formative assessment of results in first several lessons (and pre-segment lessons of unit).

7. What formal and informal assessments will you use?   
In line with class practice, we will use frequent formal assessment, with approximately two items per course session. Instruments include pre-assessment homework, classwork, regularized course notes, online questions, and a traditional test.

Opportunities for informal assessment are readily available during in-class time, as flipped structure results in high degree of interaction with students during work time. Information from simple observation and consideration of student work and questions will be systematically supplemented by asking assessing questions.

8. What questions or concerns do you have at this point?  
Fitting into the flipped paradigm requires modification to what I’d initially envisioned. I should note that Mr. Murawski has been willing to “un-flip” the class for my segment, but I don’t think that’s the best plan for students, and I appreciate the extra challenge as a chance to learn how to fit into a new way of teaching. In particular, developing the video materials I’ll need is new to me and the initial lesson plans required quite a bit of new work.

The next-to-last pre-segment lesson, on solving polynomial equations, was very difficult for students and would have to be tallied a partial failure. The need to shore up understanding of this essential material may delay or otherwise mutate the segment to some degree.

Finally, there are several practical concerns, including an assembly of unknown duration Tuesday, a day off Friday, and a pending unit test, that need to be accounted for. These may result in slight shifts to the schedule, certain classes getting off-schedule, or other changes to accommodate.