# Teaching Practicum

## Achieving Competency in the Massachusetts Professional Standards

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Any teacher in Massachusetts is required to satisfy five Professional Standards: Plan Curriculum and Instruction, Deliver Effective Instruction, Manage Classroom Climate and Operation, Promote Equity, and Meet Professional Responsibility.  Student teaching in a high school in Massachusetts exposes one to these standards and challenges them to meet them just as any other teacher would.  It was imperative that I included these standards in my everyday classroom and provide proof that each was met successfully.

# Table of Contents

# Chapter One: Massachusetts Education

## Massachusetts Education Reform Act of 1993

The Massachusetts Education Reform Act of 1993 was signed into law in order to create standards that would help improve the education received in the public schools of Massachusetts over the next seven years. Three of the major ideas involved in the law are "greater and more equitable funding to schools, accountability for student learning, and statewide standards for students, educators, schools and districts." (Goulet) One of the first major changes that the Education Reform Act brought was the introduction of a statewide curriculum framework for all students in each of the core academic subjects. In the past the only requirements were for history and physical education, but the Education Reform Act helped spread those requirements to all other core subjects: science/technology, mathematics, world languages, the arts, health, and English/language arts. In addition to these frameworks, students also had to adjust to the addition of a new statewide standardized test: the Massachusetts Comprehensive Assessment System, or the MCAS. The MCAS was created to test students to see if the frameworks requirements were being met in the classroom. Schools have now grown to create classes and preparation courses based solely on the MCAS in order to help make their students more successful.

Additionally, the Education Reform Act created changes in graduation standards, the foundation budget, charter schools, time and learning, teacher testing, and district performance. Some of the biggest changes teachers have had to adapt to from the passing of the Act was the new requirement to pass tests in communication and literacy skills in addition to their subject matter; these tests are referred to as the Massachusetts Tests for Educator Licensure, or the MTELs. Finally, Massachusetts teachers are now required to meet the five major standards in their classrooms. These standards are to plan curriculum and instruction, deliver effective

instruction, manage classroom climate and operation, promote equity, and meet professional responsibilities.

## Massachusetts Performance

Overall, the United States is seriously underperforming when it comes to proficiency in mathematics. Based on the Programme for International Student Assessment (PISA) the United States had a proficiency rate of only 32% which ranked them thirty-second in the rankings of all the countries that participate in PISA. There were a few countries right around that one-third proficiency level with the United States but most countries have a majority of their students considered proficient in mathematics. For example, Korea had 58% at that proficient level and Finland has 56%. At the top of the list is Shanghai with a math proficiency rate of 75%, more than double the measly one-third rate that the United States has. One thing to take into consideration is that students from Shanghai "are from a prosperous metropolitan area within China, with over three times the GDP per capita of the rest of that country." (Peterson, Woessmann, Hanushek, & Lastra-Anadón, 2011) That being said, it would be more appropriate to compare their performance with the state of Massachusetts, one of the top states in the United States.

Despite still being less than Shanghai, Massachusetts does at least has more than half of their students at the proficient level, 51% to be exact. Comparisons with other states show that Massachusetts is the leader in mathematics proficiency with Minnesota behind them at 43%, followed by four other states with proficiencies above 40%, Vermont, North Dakota, New Jersey, and Kansas. The difference between the United States as a whole, or even the individual states, and those highly proficient countries is not new information. Those differences are the

reasons why Massachusetts created the Education Reform Act and why there are so many

Professional Standards that teachers of Massachusetts are required to follow.

## Worcester Public Schools

Worcester Public Schools is the school district that serves Worcester, Massachusetts.

The district consists of forty-four schools with a breakdown of seven high schools, four middle

schools, and thirty-three elementary schools.  Worcester is broken down into four quadrants to

help determine which schools students will attend.  There is the North Quadrant, the South

Quadrant, the Doherty Quadrant which services the west, and the Burncoat Quadrant which

services the east.

The Worcester Public School system has a very similar gender breakdown as the rest of

the state and four of the seven race classifications have a 2.2% or less difference between the

state and the district numbers.  The three races with significant differences between district and

state are: African American at 5.6% higher in the district, Hispanic at 21.7% higher in the

district, and White at 30.2% lower in the district.  Approximately 51% of the population of both

the district and the state is made up of males.  These exact breakdowns and numbers can be

found in the following section.

As mentioned before, each student in Massachusetts is required to take the MCAS

standardized test.  Worcester Public Schools typically have a lower percentage of students in the

advanced and proficient categories than the state of Massachusetts does, and a higher percentage

in the needs improvement and failing sections.  This trend is common among all three sections,

English/language arts, mathematics, and science and technology/engineering.  However, the

district has shown overall improvement in all three categories at the tenth grade level from the

spring of 2009 to the spring of 2012.  Again, the precise numbers can be found in the next

section with an additional column for Doherty Memorial High School itself.

## Doherty Memorial High School

Doherty Memorial High School opened in the fall of 1966 at 299 Highland Street in

Worcester, Massachusetts.  The school replaced two closing schools: Worcester Classical High

School and Worcester Commerce High School.  Doherty is one of seven high schools in

Worcester and serves the west side of the city and is in the clearly named Doherty Quadrant of

Worcester.

Unlike the Worcester Public Schools district and the state of Massachusetts, Doherty

Memorial High has a student body made up of roughly 50% males and 50% females.  The racial

enrollment at Doherty is typically a percent found between the two percentages given for the

district and the state except for one race, Native American.  The charts below illustrate the

gender and racial breakdowns for Doherty Memorial High, Worcester Public Schools, and the

state of Massachusetts.

| Enrollment by Gender (2012 – 2013) | | | |
|---|---|---|---|
| Gender | School | District | State |
| Male | 664 | 12,824 | 489,289 |
| Female | 669 | 11,916 | 465,484 |
| Total | 1,333 | 24,740 | 954,773 |

| Enrollment by Race/Ethnicity (2012 – 2013) | | | |
|---|---|---|---|
| Race | % of School | % of District | % of State |
| African American | 14.0 | 14.2 | 8.6 |
| Asian | 9.7 | 8.1 | 5.9 |
| Hispanic | 29.5 | 38.1 | 16.4 |
| Native American | 0.7 | 0.3 | 0.2 |
| White | 43.7 | 35.8 | 66.0 |
| Native Hawaiian, Pacific Islander | 0.0 | 0.0 | 0.1 |
| Multi-Race, Non-Hispanic | 2.5 | 3.5 | 2.7 |

Students in the tenth grade at Doherty Memorial High School are required to partake in the MCAS standardized tests. Typically, Doherty tends to stay around the state average in the English/language arts and mathematics sections but do a bit worse in the science and technology/engineering section. Over the past four years, from spring of 2009 to spring of 2012, Doherty has made no significant improvements or decreases in their percentages of students in each of the four categories: advanced, proficient, needs improvement, and failing. The following charts show the outcomes of the MCAS tests for the spring of 2012 for Doherty, Worcester, and Massachusetts.

| MCAS Tests of Spring 2012 – Percent of Students at Each Achievement Level for Doherty M.H.S | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Advanced | | Proficient | | Needs Improvement | | Failing | |
| Grade and Subject | School | State | School | State | School | State | School | State |
| Grade 10- English/Language arts | 31 | 37 | 49 | 51 | 15 | 9 | 5 | 3 |
| Grade 10- Mathematics | 48 | 50 | 24 | 28 | 18 | 15 | 10 | 7 |
| Grade 10- Science and Tech/Eng | 12 | 24 | 46 | 45 | 30 | 25 | 12 | 6 |

| MCAS Tests of Spring 2012 – Percent of Students at Each Achievement Level for Worcester | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Advanced | | Proficient | | Needs Improvement | | Failing | |
| Grade and Subject | District | State | District | State | District | State | District | State |
| Grade 10- English/Language arts | 21 | 37 | 55 | 51 | 19 | 9 | 5 | 3 |
| Grade 10- Mathematics | 35 | 50 | 27 | 28 | 23 | 15 | 14 | 7 |
| Grade 10- Science and Tech/Eng | 7 | 24 | 39 | 45 | 43 | 25 | 11 | 6 |
| All Grades- English/Language arts | 10 | 19 | 41 | 50 | 31 | 22 | 18 | 9 |
| All Grades- Mathematics | 16 | 27 | 25 | 32 | 30 | 26 | 29 | 15 |
| All Grades- Science and Tech/Eng | 5 | 17 | 26 | 37 | 40 | 32 | 28 | 13 |

| Grade 10 – English/Language Arts for Doherty M.H.S | | | | | Grade 10 – Mathematics for Doherty M.H.S | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Achievement Level | 2009 | 2010 | 2011 | 2012 | Achievement Level | 2009 | 2010 | 2011 | 2012 |
| Advanced | 20 | 15 | 30 | 31 | Advanced | 43 | 42 | 45 | 48 |
| Proficient | 55 | 56 | 48 | 49 | Proficient | 23 | 25 | 28 | 24 |
| Needs Improvement | 20 | 24 | 17 | 15 | Needs Improvement | 20 | 21 | 16 | 18 |
| Failing | 5 | 6 | 5 | 5 | Failing | 14 | 11 | 11 | 10 |

| Grade 10 – Science & Tech/Eng for Doherty M.H.S | | | | |
|---|---|---|---|---|
| Achievement Level | 2009 | 2010 | 2011 | 2012 |
| Advanced | 8 | 5 | 12 | 12 |
| Proficient | 37 | 40 | 48 | 46 |
| Needs Improvement | 45 | 47 | 31 | 30 |
| Failing | 10 | 8 | 9 | 12 |

| Grade 10 – English/Lanugage Arts for Worcester | | | | |
|---|---|---|---|---|
| Achievement Level | 2009 | 2010 | 2011 | 2012 |
| Advanced | 18 | 12 | 19 | 21 |
| Proficient | 49 | 51 | 49 | 55 |
| Needs Improvement | 24 | 30 | 22 | 19 |
| Failing | 9 | 8 | 10 | 5 |

| Grade 10 – Mathematics for Worcester | | | | |
|---|---|---|---|---|
| Achievement Level | 2009 | 2010 | 2011 | 2012 |
| Advanced | 30 | 32 | 31 | 35 |
| Proficient | 27 | 25 | 28 | 27 |
| Needs Improvement | 26 | 28 | 23 | 23 |
| Failing | 16 | 15 | 18 | 14 |

| Grade 10 – Science & Tech/Eng for Worcester | | | | |
|---|---|---|---|---|
| Achievement Level | 2009 | 2010 | 2011 | 2012 |
| Advanced | 4 | 3 | 6 | 7 |
| Proficient | 30 | 33 | 34 | 39 |
| Needs Improvement | 53 | 52 | 45 | 43 |
| Failing | 14 | 13 | 15 | 11 |

The MCAS testing system is not the only way to judge the success rate of Doherty Memorial High School.  In addition, there is also the more traditional graduation, dropout, and college acceptance rates illustrated in the following table.  As you can see, the graduation rate is just over 80% which is about 10% higher than the graduation rate for all of the Worcester Public Schools at 72.3%.  It is shown that typically males have a higher dropout rate from Doherty, but also go on to receive their GED more consistently.  The group of students with the highest dropout rate is Students with Disabilities at 18.5% while the group of students with the lowest graduation rate are English Language Learners at 68.9%.  The lowest dropout and highest graduation rates are found in the Asian population at 2.5% and 97.5% respectively.

| 4-Year Graduation Rate (2012) – Doherty Memorial High School | | | | | | |
|---|---|---|---|---|---|---|
| Student Group | # in Cohort | % Graduated | % Still in School | % Non-Grad Completers | % GED | % Dropped Out |
| All Students | 340 | 82.1 | 5.0 | 0.9 | 3.2 | 8.8 |
| Male | 151 | 76.8 | 7.9 | 0.7 | 4.6 | 9.9 |
| Female | 189 | 86.2 | 2.6 | 1.1 | 2.1 | 7.9 |
| ELL | 61 | 68.9 | 13.1 | 3.3 | 0.0 | 14.8 |
| Students with Disabilities | 65 | 69.2 | 9.2 | 1.5 | 1.5 | 18.5 |
| Low Income | 234 | 79.9 | 6.4 | 1.3 | 2.6 | 9.8 |
| High Needs | 250 | 79.2 | 6.4 | 1.2 | 2.4 | 10.8 |
| African American/Black | 45 | 80.0 | 6.7 | 2.2 | 2.2 | 8.9 |
| Asian | 40 | 97.5 | 0.0 | 0.0 | 0.0 | 2.5 |
| Hispanic/Latino | 92 | 72.8 | 5.4 | 2.2 | 3.3 | 16.3 |
| White | 158 | 83.5 | 5.7 | 0.0 | 4.4 | 6.3 |

Additionally, 25% of Doherty Memorial High School plans to go to a 4-year private college, 29% plans to go to a 4-year public college, 1% plans to go to a 2-year private college, 32% plans to go to a 2-year public college, 2% have plans for some other post-secondary education, 7% plans to go directly into the workforce, 1% will be entering the military, and 3% of the school senior population are unsure of their plans after graduation.

While at Doherty Memorial High School I observed and taught four classes: Statistics, Numeracy, and two classes of Advanced Algebra II.  The first classes I started with were the two classes of Advanced Algebra II where I started teaching about the quadratic formula in periods four and five.  Both classes were a mix of sophomores and juniors while period four consisted of twenty-nine students and period five had twenty-four students.  These classes were the easiest to teach because the students seemed interested in learning and because they were honor level mathematics students.  After I felt more comfortable with those classes I took on the Statistics class during first period.  This class consisted of fourteen seniors and one junior and was more difficult since many of the seniors had given up on school and weren't interested in learning so early in the morning.  Finally, I began teaching the Numeracy course during second period.  This

class was by far my most challenging class to teach due to the nature and level of the course. Numeracy was designed to help students focus on the information that would be tested on the MCAS and to serve as a supplement to their math class they were already taking.  This class was made up of freshmen that weren't interested in being at school and did not enjoy learning math.

## English Language Learners (ELLs)

English Language Learners, also known as ELLs or ELL students, are "non-native English speakers who are learning English in school." (Boyle & Peregoy, 2013)  An ELL is a student whose first language is not English and are evaluated based on their knowledge, understanding, and use of the English language and then placed in specific classes or situations that will help them develop their knowledge of English.  This evaluation is based on the TESOL's language proficiency standards with the following five standards:

1. English language learners communicate for social, intercultural, and instructional purposes within the school setting.
2. English language learners communicate information, ideas, and concepts necessary for academic success in the area of language arts.
3. English language learners communicate information, ideas, and concepts necessary for academic success in the area of mathematics.
4. English language learners communicate information, ideas, and concepts necessary for academic success in the area of science.
5. English language learners communicate information, ideas, and concepts necessary for academic success in the area of social studies.

Students who are considered English Language Learners are assessed on each of the standards and placed on a scale to highlight their language acquisition and help track their growth throughout their studies.  The scale is broken down into five categories:

- Level 1: Starting - students have limited to no understanding of English and rarely use English for communication.
- Level 2: Emerging – students can understand some phrases and short sentences.  This allows for some communication in routine situations with simple and memorized phrases.

- Level 3: Developing – students understand more complex sentences buy still need occasional repetition.  The students are still restricted by a limited vocabulary.
- Level 4: Expanding – at this stage students are able to communicate in their usual everyday settings and are comfortable attempting new sentences and ideas in English.
- Level 5: Bridging – these students are fluent when communicating in English and are able to use their knowledge in school and social settings.

Once a student is placed in one of these levels they are reassessed numerous times throughout their schooling and that level is used to help them gain the help they need.

In the Worcester Public Schools there are approximately 4,000 English Language Learners with more than 2,000 of them being Spanish speakers, more than 600 being Vietnamese speakers, and more than 50 speakers of: Albanian, Arabic, Chinese (Mandarin and Cantonese), French, Polish, and Portuguese.  Worcester Public Schools and Doherty Memorial High School have the following percentages of English Language Learners:

| Title | % of School | % of District | % of State |
|---|---|---|---|
| First Language not English | 44.5 | 44.0 | 17.3 |
| English Language Learner | 25.8 | 34.3 | 7.7 |

# Chapter Two: Plans Curriculum and Instruction

The first professional standard for teachers in Massachusetts is to plan curriculum and instruction. This standard is broken down into nine subsections:

1. *Draws on content standards of the relevant curriculum frameworks to plan sequential units of study, individual lessons, and learning activities that make learning cumulative and advance students' level of content knowledge.*

Three of the classes I taught each day were all centered on Algebra; obviously the two Advanced Algebra II classes but also the Numeracy class involved a bit of Algebra as well. There are fairly specific curriculum frameworks that teachers have to follow for each topic they will teach. Below is part of the Algebra one that I focused on in my classes. Topics one and three were discussed in the Numeracy class while topics two and four were discussed in the Advanced Algebra II classes. In the Advanced Algebra II classes I began with the fourth topic, most specifically the quadratic formula because they had just learned factoring. After that we continued on to completing the square and were able to see how multiple methods could allow you to arrive at the same answer. One of the first topics I covered with the Numeracy class was reviewing how to solve one and two step equations, which are topics one and three below. This was mostly a review as many of the students had seen this before, but it was clearly much needed since numerous students struggled with the concept. Included in the "Lesson Plans" section of the appendix are various lesson plans for each of my four classes that demonstrate how I drew on the curriculum frameworks and planned out the lessons, activities, and homework that helped tie in all the information the students had learned thus far.

| Reasoning with Equations and Inequalities | A-REI |
|---|---|

**Understand solving equations as a process of reasoning and explain the reasoning.**

1.  Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.
2.  Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.

**Solve equations and inequalities in one variable.**

3.  Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.
    MA.3.a. Solve linear equations and inequalities in one variable involving absolute value.
4.  Solve quadratic equations in one variable.
    a.  Use the method of completing the square to transform any quadratic equation in $x$ into an equation of the form $(x – p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form.
    b.  Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula, and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers $a$ and $b$.
    MA.4.c. Demonstrate an understanding of the equivalence of factoring, completing the square, or using the quadratic formula to solve quadratic equations.

   *2. Draws on results of formal and informal assessments as well as knowledge of human development to identify teaching strategies and learning activities appropriate to the specific discipline, age, level of English language proficiency, and range of cognitive levels being taught.*

In order to test the students through formal assessments I first had to make those

assessments based on what we had discussed in class. Several of those assessments can be found

in the "Tests and Homework" section of the appendix. After giving the test I would look back

on the grades and determine if I felt the class had sufficiently learned the material. There were a

few times I decided that the class needed more review on that topic and would go back and re-

teach material we had just covered. This was the case in my first period Statistics class when we

were going over the Geometric and Poisson Distributions. After reviewing the concepts again I

distributed another test, both of which can be found in the appendix.

I also found a way to include informal assessments based on class participation and effort

on homework. Through a bit of trial and error I determined that my teaching was more helpful

when combined with individual work on the material we were discussing. It was even more

helpful when there was teacher guidance through the examples as well.  That teacher guidance also served as a sort of informal assessment because I was able to work one-on-one with students and see where they truly were.

3. *Identifies appropriate reading materials, other resources, and writing activities for promoting further learning by the full range of students within the classroom.*

Despite being a math teacher, I was still required to help further the learning of my students in other areas of educations such as reading and writing.  This was accomplished by assigning reading from the book for them to look at and try to understand on their own before we reviewed as a class.  Another aspect I tried to work into my teaching was being able to verbally express the math we were learning.  To help with this I liked having the students explain the steps they were taking, especially while answering problems up at the board.  One method I really liked was having several students write their answers up on the board and then explain how they arrived at the answer.  This helped to further their verbal skills and give them a better opportunity to truly understand the material.

4. *Identifies prerequisite skills, concepts, and vocabulary needed for the learning activities* .

By definition, math is a very cumulative subject in that you need to understand the prior material before moving on to more information.  Especially coming in as a student teacher it was important to know what the students had learned in the past and what they hadn't.  When I began teaching the quadratic formula to my fourth and fifth period Advanced Algebra II students it was very helpful that I had observed them learning to factor so I was able to identify those previous skills and vocabulary that they had learned before.  Occasionally it was necessary to go back and review those prerequisites in order to ensure that the students were getting the most out of the lesson.  For example, I had witnessed the first period Statistics class go over certain distributions numerous times; however, when I would reference those distributions I would have to review

them in order for them to make the correct connections.  It is important to make the bridge between that prior knowledge and the new information.

5. *Plans lessons with clear objectives and relevant measurable outcomes.*

Typically I would inform the class of the objectives verbally before the class and before we started a new chapter.  Giving a breakdown of the next week or so would help the class to anticipate what they would be learning in the upcoming classes.  Each time I described the objectives we would be achieving I tried to make them as clear as possible without going into too much detail.  It is important that the students understand what topics to expect without being confused in the specifics of the topic until it is time for them to learn it.  Located in the "Lesson Plans" section of the appendix is an example of one of my weekly plans for my Advanced Algebra II classes.

It is also important that the students can see how they are progressing through the objectives.  Through the various homework assignments I would assign during the week and the class work they would participate in, the students were able to reflect on how they were learning the material.  This gave a sense of measurable outcomes because the students, as well as myself, could determine if they were able to complete the assignments successfully or if they still need some review on a certain objective.  Some examples of these homework assignments are included in the "Tests and Homework" section of the appendix.

6. *Draws on resources from colleagues, families, and the community to enhance learning.*

All teachers have different ideas and techniques for teaching so it is important to collaborate with those teachers in order to find the best methods for your classroom.  I was fortunate enough to observe my mentor and another math teacher at Doherty.  The two did things very differently so I was able to take resources and ideas from both of them and mesh them into

one cohesive strategy.  It is also important to make sure the methods you use work well with the

backgrounds of the students.  Using the communities they come from as a source of information

can help make that transition more helpful.

      7.   *Incorporates appropriate technology and media in lesson planning.*

      One difficulty present by being at a school like Doherty was the lack of technology and

equipment.  The room I taught in did not have an overhead projector or a projector and screen to

use the computer with.  Those restrictions made it more difficult to be able to use technology and

media in the lesson planning.  I would use the software on computers to create worksheets for the

students but was never really able to incorporate that technology into the classroom.  For the

Numeracy and Statistics classes my instructor had assigned them online work to complete by the

end of the grading period.  This gave the students the opportunity to get out of their everyday

seats and work in the library for a few classes to try and get these problems completed.  Working

in the library on those computers helped the students see the many ways they can learn math.

      8.   *Uses information in Individual Education Programs (IEPs) to plan strategies for*
           *integrating students with disabilities into general education classrooms.*

      Many of the students in my second period numeracy class had IEPs and in order to

accommodate them into one classroom I did several things.  First I would have different ways of

presenting the material so each of the students could find a way to understand.  I would present

the material to the class and then have the students all work individually or in groups.  Some

students continued to struggle so when it came time to put the answers on the board I would help

guide them through the steps until we completed the problem.  This helped establish a sense of

pride and accomplishment, knowing that they contributed by putting an answer on the board.

The information and teaching methods present on IEPs can be helpful for that particular student

to learn, but can also be useful when teaching the entire class.

9. *Uses instructional planning, materials, and student engagement approaches that support students of diverse cultural and linguistic backgrounds, strengths, and challenges.*

I definitely noticed some differences amongst students with a different cultural background than the others. In my first period statistics class two students, Aseel and Sarmad had a different background than the rest of the class but were from the same country. I think because they were from similar backgrounds, they liked to stick together and always worked with each other. They even wanted to work together on tests! Obviously this wasn't allowed, but in order to accommodate their differences I did give a lot of work that was able to be done in collaboration with others.

# Chapter Three: Delivers Effective Instruction

The second professional standard is that teachers should deliver effective instruction. This standard is broken down into four subsections:

1. *Communicates high standards and expectations when beginning the lesson:*
   a) *Makes learning objectives clear to students.*
   b) *Communicates clearly in writing, speaking, and through the use of appropriately designed visual and contextual aids.*
   c) *Uses engaging ways to begin a new unit of study or lesson.*
   d) *Builds on students' prior knowledge and experience.*

The best way to begin a class is to let the students know what material will be covered in the next hour or so. It is essential to make those objectives obvious to students so they feel they are progressing towards something as they sit in your classroom. Each day I would discuss what we had done in previous classes, what we would be doing during this class, and what the eventual goal would be. My first lessons in my fourth and fifth period Advanced Algebra II classes are good examples of how I made the class objectives clear. The class had just finished up learning how to solve quadratic equations using graphing and factoring and we would then be moving into how to use the quadratic formula and completing the square. During the beginning of that first class I had the students attempt to factor an equation that was not factorable. This applied their prior knowledge to the new topic. After they discovered that the equation could not be factored I explained that we would be learning a new way to solve quadratic equations and that eventually we would know four different ways of solving said equations. I have included a copy of this cumulative test in the "Tests and Homework" section of the appendix. This technique made it clear what we were going to be doing in class, allowed the students to pull information from their prior knowledge, and gave a broad overview of what the next few weeks had in store.

It is also important that teachers are clear in several different mediums to make sure the point gets across successfully to their students. I was sure to incorporate this into my teaching strategy by giving verbal notes as well as written notes on the board in order to make sure that each student had the chance to learn the way they felt most comfortable with. If one method didn't make sense to a student I would work on finding a different way to approach the information or try to be clearer. This was a constant learning process for me since I was always discovering new ways to share information.

2. *Communicates high standards and expectations when carrying out the lesson:*
   a) *Uses a balanced approach to teaching skills and concepts of elementary reading and writing.*
   b) *Employs a variety of content-based and content-oriented teaching techniques from more teacher-directed strategies such as direct instruction, practice, and Socratic dialogue, to less teacher-directed approaches such as discussion, problem solving, cooperative learning, and research projects (among others).*
   c) *Demonstrates an adequate knowledge of and approach to the academic content of lessons.*
   d) *Employs a variety of reading and writing strategies for addressing learning objectives.*
   e) *Uses questioning to stimulate thinking and encourages all students to respond.*
   f) *Uses instructional technology appropriately.*
   g) *Uses effective strategies and techniques for making content accessible to English language learners.*
   h) *Demonstrates knowledge of the difference between social and academic language and the importance of this difference in planning, differentiating and delivering effective instruction for English language learners at various levels of English language proficiency and literacy.*

It is important to have teachers use different teaching styles to get the point across to their students. Not every student will learn well when just being lectured to, just like not all students will understand the material enough when all they have done is practice problems individually. In order to make my classes more useful for all of my students I tried to include several different teaching strategies included, but not limited to, lecturing, individual problems, group exercises,

and individual note taking.  I found it was best to mix up which technique is used and to really

consider the topic at hand in order to find the best teaching method.

As for ELL students, it is important to not assume they understand more than they

actually do as that could be detrimental to their understanding and their schooling in the present

and the future.  I was sure to try and keep the language I used simple enough so all the students

were comfortable and understood what I was talking about.  In the few instances where this was

not the case I explained more plainly what I was trying to say and made a mental note for the

future in order to avoid any confusion.

3. *Communicates high standards and expectations when extending and completing the lesson:*
   a) *Assigns homework or practice that furthers student learning and checks it.*
   b) *Provides regular and frequent feedback to students on their progress.*
   c) *Provides many and varied opportunities for students to achieve competence.*

Homework is a way to easily check whether the student is grasping the concept being

discussed in class. I would try to assign homework at least three times a week in order to make

sure that the students successfully understood the work and could reproduce the process on their

own.  The day after homework was assigned I would either collect the homework or walk around

to check that it was completed.  While it is important to make sure that the students are getting

the problems right, I feel it is more beneficial to grade homework based on effort.  This helped

make it easier for the students to get better homework grades which would then help to improve

their overall grade.  Their grades were only based on effort but we would still go over each

homework assignment in detail on the day it was due.  Depending on other things that needed to

be accomplished that day, some days we would put every example on the board while others we

would just focus on the ones that people struggled with.  In addition to giving the students

feedback on how they did on their homework, this also allowed me better insight into which topics or examples students were having the most issues with.

Students were always able to access their grades online and were always given back any quizzes, tests, or homework assignments that were graded based on correctness. I would make sure that they received the feedback quickly so it would be the most helpful to them succeeding in the future. It is not useful to students to receive feedback on quizzes and homework long after they finished that chapter, so I would be sure that they had all the necessary study materials well before any major tests. While testing is not the best measure of competency for all students, it is the easiest to use in a short span of time like student teaching. I would attempt to vary my tests based on the information I gathered throughout the classes and on homework. Each student would be allowed enough time on the tests and always knew that I was around to discuss a bad grade with. While it is difficult to make it fair for everyone, I would try to remain flexible for students that were struggling and allow them another chance to show their understanding of the material. One example of this occurred during my first period statistics class. The class appeared to understand the material when we would go over it in class; however, almost all of the students performed poorly on the test given at the end of the chapter. Instead of leaving this test as the final grade, I reviewed the material with the class and after they seemed more confident allowed the students to take a different but similar test to prove their competency. I took the higher of the two test grades and saw that almost all of the test scores improved significantly the second time around.

4. *Communicates high standards and expectations when evaluating student learning:*
   a) *Accurately measures student achievement of, and progress toward, the learning objectives with a variety of formal and informal assessments, and uses results to plan further instruction.*
   b) *Translates evaluations of student work into records that accurately convey the level of student achievement to students, parents or guardians, and school personnel.*

The easiest way to determine competency is usually through tests, quizzes, or homework. But sometimes this is not the best way for the students. I learned this specifically through my second period Numeracy class who didn't usually respond well to tests and rarely brought their homework back with them the next day. Instead of measuring their achievement solely by giving them written assignments, I would also find other ways to informally test their understanding. One of the most common ways of using an informal assessment to give a grade would be to give grades based on daily participation on a scale of one to five. At least three to four times a week I would distribute number strips to the Numeracy class. They would typically have about three minutes to finish this strip that consisted of problems that were addition, multiplication, subtraction, or division. The strips were then collected and the amount of the strip completed factored into their participation grade for the day. An example of one of these number strips can be found in the 'Activities' section of the appendix. This grade would also be based upon their effort at answering questions or putting solutions up on the board, their focus when I was speaking, and their behavior throughout the duration of the class. Using this informal way of measuring achievement allowed me to see how they understood the material while at the board and answering questions, but also based their grade off of effort put into class that day.

Towards the end of my time at Doherty I had felt that many of my lessons weren't as exciting as they could be. In order to fix this I decided we would have somewhat of a game in

my fourth and fifth periods Advanced Algebra II classes.  I created bingo sheets where each space was the answer to a radical simplification problem.  I would write out the problem on the board and the students would have to solve it in order to figure out which space they should check off.  Once a student achieved bingo they received a prize of a piece of candy and we continued until each student was able to get bingo!  An example of one of these bingo cards can be found in the 'Activities' section of the appendix.  This activity really seemed to help the students feel more excited about reviewing their radical simplification rules.

# Chapter Four: Manages Classroom Climate and Operation

The third professional standard is to manage classroom climate and operation which has the following four subsections:

1. *Creates and maintains a safe and collaborative learning environment that values diversity and motivates students to meet high standards of conduct, effort and performance.*
2. *Creates a physical environment appropriate to a range of learning activities.*
3. *Maintains appropriate standards of behavior, mutual respect, and safety.*
4. *Manages classroom routines and procedures without loss of significant instructional time.*

Being able to manage and control a classroom is something that I feel comes with a great deal of practice and experience. While the rules and nature of school in general made it fairly easy to create a safe learning environment, it was more challenging to make sure the learning environment was as best as can be. This is one area that my student teaching allowed me to learn by example of what not to do. Upon entering my classroom it was clear that my mentor created a more relaxed classroom than the normal structure that I would prefer. Throughout my time observing I noticed many things I would not do or allow; including cell phone use, side conversations, and the lack of work actually being accomplished by the students. When I took over as the teacher it was fairly difficult to change their classroom drastically since this is what they had been used to all year long. However, I did my best to make it more structured and made sure the students were actually being productive during individual work time. This involved strategies such as having more work prepared, going over answers, and including structured group time where the students had something they were expected to accomplish by the end of the class. One major thing I noticed by walking into a classroom mid way through the year, was that it is far easier to become more relaxed during the year if the class is meeting your standards than to become more strict once they have become more comfortable.

# Chapter Five: Promotes Equity

The fourth of the professional standards for teachers is to promote equity. This standard is broken down into five subsections:

1. *Encourages all students to believe that effort is a key to achievement.*

A challenging aspect of teaching is making sure all of the students are excited to learn and are putting in the maximum amount of effort they can. It is far too easy for a student to give up and feel like they aren't able to understand a topic. My goal as a student teacher was to make sure that all students felt like they were learning and could complete the assignments as easily as everyone else. During my fourth and fifth period Advanced Algebra II classes I would be honest with the students when I knew a certain topic was going to be particularly challenging, but I would also make sure they knew that I would be there to help them fully understand no matter how long it took. I found it was helpful to ask the students to either explain the process of a particular topic, such as the quadratic formula, or try to describe what specific step they were struggling with. This allowed me to isolate that specific area and review topics we had previously discussed. No matter how difficult a student found the subject, I would make sure they were always encouraged to keep trying. This attitude caused me to grade homework based on effort rather than correctness. I feel this technique is more helpful because it shows that homework is there to help them and as long as the students try their best on the homework, they will be on their way to succeeding in the class.

2. *Works to promote achievement by all students without exception.*

It is important that all students in the class participate and understand the material being discussed. In order to judge that this was happening and to be fair in my expectations of all students I would call randomly on students to give answers or come to the board to work out a problem. One technique I would use in my Numeracy class was to write problems on the board

and then write the name of a student that I wanted to come and do the problem. This allowed all students to participate and helped me to make sure that they understood it. By having students complete problems on the board I was able to watch them and decide if they had all grasped the concept.

3. *Assesses the significance of student differences in home experiences, background knowledge, learning skills, learning pace, and proficiency in the English language for learning the curriculum at hand and uses professional judgment to determine if instructional adjustments are necessary.*

Every student is going to be different. Some will be raised in a different kind of household, some will speak a different language, some may have been born in a different country, etc. These differences are what makes this country so diverse and is something that should be embraced in schools. It is essential to address these differences in the classroom by understanding how students may learn differently and then by including those discrepancies in the everyday classroom life. In my first period statistics class, there were two students that were from a different country and clearly had grown up differently than the typical American student. This caused some difficulties when creating examples of the material we were working on. Numerous times I would create examples to go over as a class and then as we were discussing the math the students would bring to my attention that they were not sure what the example even meant. Over time I learned to only have simple examples that were more pertinent to their lives or were easy to explain in case they didn't understand.

4. *Helps all students to understand American civic culture, its underlying ideals, founding political principles and political institutions, and to see themselves as members of a local, state, national, and international civic community.*

This part of the standard is something that is instilled in most American classrooms instead of in individual lesson plans. Each day we would recite the Pledge of Allegiance to understand more of the American culture. In addition to this, there were always days where the

class would take a break from math and focus on other important discussions sometimes involving different historical issues. For example, those students born in a different country from my first period statistics class had would ask for more information about historical examples that were found in the statistics text book we would use. These questions would then lead into a class discussion that, while not about math specifically, is an important aspect of school.

5. *Collaborates with families, recognizing the significance of native language and culture to create and implement strategies for supporting student learning and development both at home and school.*

Understanding the background of your students and incorporating that into your lessons is important in order to make sure every student is getting the maximum amount possible out of the class. Coming into classes halfway through the year made this part of the standard more difficult to meet. However, a chapter at the beginning of a class about the backgrounds of all of the students would be helpful to get to know more about their lives and how their backgrounds can be worked into the curriculum.

# Chapter Six: Meets Professional Responsibilities

The fifth and final professional standard is to meet professional responsibilities with the following seven subsections:

1. *Understands his or her legal and moral responsibilities.*

Teachers are responsible for molding the minds of young children and helping them to become the best humans they can be.  This involves a lot of legal and moral responsibilities that teachers must adhere to.  As a future teacher and as a student teacher, I fully understand my legal and moral responsibilities.

2. *Conveys knowledge of and enthusiasm for his/her academic discipline to students.*

The best teachers are those that care about their students and the subject that they teach.  Students are going to be most excited about learning when their teacher is excited about teaching and makes them want to learn the material.  Typically this standard is expressed through the teachers' words and actions.  I would make sure the class knew which topics I thought were the most fun and would try to teach all classes in a fun and exciting way so the students were more interested in learning.  This would sometimes involve colorful markers, exciting worksheets, and daily puzzles or games.

3. *Maintains interest in current theory, research, and developments in the academic discipline and exercises judgment in accepting implications or findings as valid for application in classroom practice.*

This standard was easy for me to demonstrate since while I was student teaching I was also enrolled in several math classes at WPI.  Still being a student allowed me to continue to further my education and learn new things about math while still relaying information in the classroom.

In addition to learning higher math, I would also research different methods and ideas for

teaching the topics we were covering in my high school classes.  One topic I remember looking

further into was the Fundamental Theorem of Algebra.  Finding research on this topic, and how

to best present it to the class, allowed me to be more prepared to teach it to my fourth and fifth

period classes of Advanced Algebra II.  Not fully understanding the Fundamental Theorem of

Algebra is one of the biggest reasons why students struggle with math in the future so it is

imperative to make sure they understand.

4. *Collaborates with colleagues to improve instruction, assessment, and student achievement*

One of the best things a teacher can do in order to improve is to lean on their colleagues

and fellow teachers for support, guidance, and ideas.  No one teacher can come up with every

great idea on how to get a point across to their students.  Instead, they rely on other teachers to

give them suggestions.  Fortunately for me, I was student teaching at Doherty at the same time as

another WPI student so we were able to discuss our classes and how we approached different

problems or topics.  I also was able to ask my mentor for assistance and his suggestions on how

to best teach the class and how they responded to certain assignments.  In addition, I was also

able to observe another teacher teaching the same Advanced Algebra II class with the same

topics.  This gave me another outlook to use when planning my classes in order to make each

class more unique and exciting.

5. *Works actively to involve parents in their child's academic activities and performance, and communicates clearly with them.*

I feel it is extremely important that teachers are kept up to date on what their children are

doing in school and if they are succeeding.  The best way for this to happen is to make sure that

the teacher and parents have a direct line of communication and involvement.  As a student

teacher this was more difficult than it would be as the lead teacher.  Parents did have access to

students' grades but any sort of question or concern was brought to my mentor since he was overlooking everything that I did while at Doherty.

6. *Reflects critically upon his or her teaching experience, identifies areas for further professional development as part of a professional development plan that is linked to grade level, school, and district goals, and is receptive to suggestions for growth.*

The main goal of student teaching was to help me learn which areas of education I needed to develop more. It was extremely helpful for me to reflect each day upon the classes that I taught and think about which parts went well and which parts needed a little more work. During the beginning of my student teaching it was also helpful when my mentor would take notes during my classes and then sit down with me afterwards and discuss things I did well and things I needed to improve upon. For example, during my first few classes it was brought to my attention that I tended to rush through things rather than take the time to have the class respond to make sure they understood. This feedback allowed me to slow down during my lectures and helped to involve the class more. Changing this style resulted in more understanding from the students and better grades on tests and homework.

7. *Understands legal and ethical issues as they apply to responsible and acceptable use of the internet and other resources.*

While student teaching at Doherty my students were not exposed to using the internet as much as they could be at other times during my teaching career. Occasionally my second period Numeracy class would spend some time in the library in order to complete some online math problems that were assigned to them at the beginning of each semester. Using the internet has become much more common in schools and can involve a lot of risks if not understood or used properly which is why it has many legal and ethical restrictions. As a teacher, I understand these issues as they apply to the use of the internet and other resources.

# Chapter Seven: My WPI Education

Worcester Polytechnic Institute is a very challenging school well known for producing excellent students and workers. My time at WPI has taught me a lot of knowledge, especially math, and also a lot about myself. As an Actuarial Mathematics major I have taken a lot of higher level math classes that use the topics that I was able to teach in my classes at Doherty. This helped greatly when trying to explain the concepts to the students and how they could be applicable in the future. My first period statistics class was especially easy to connect with because a lot of the material covered there was focused on in various probability and statistic classes here at WPI. Many students constantly ask where this information will come in handy in the future and my major allows me to have a good answer to that question. Actuarial students are working toward a career that directly involves math and things that you learn in high school so it is a good way to show the students how you can actually use all those things they teach you out in the real world.

Not only was WPI a good source of information that I was able to relate to, but it was also a good way to show the students that if they try hard enough they will be able to succeed and attend an impressive university some day. I enjoyed sharing stories with my students about my classes at WPI and some of the exciting things they had to look forward to about college. Hopefully this provided some sort of motivation to them so they would look forward to a promising future in college and beyond.

Another way WPI was especially helpful was through the Teacher Preparation program I was able to take part in. These classes taught me more techniques on teaching and made me think of things I hadn't considered before. It also gave me the opportunity to observe a classroom before I walked into my student teaching which helped me to feel more acclimated

and comfortable being in a classroom as an observer.  The numerous psychology and education based classes that WPI requires of all students in the Teacher Preparation Program were useful once I was able to step foot into a classroom.

Finally, being a student and a teacher simultaneously allowed me to remember the struggles that all students have when learning new material.  This gave me the opportunity to empathize with the students when they were struggling with a certain topic and allowed me to reflect on the best way to help them feel more comfortable.  I was also able to use my background as a student to come up with new ways of making the classroom more exciting and useful to all students.  It was a good reminder that the career of teaching is always changing and there are many different ways to be a good teacher.

# Chapter Eight: My Classes

## Statistics – First Period

First period Statistics was the third class I began teaching. It was made up of fifteen students; eight males and seven females. Fourteen of the students were seniors and one of the girls was a junior. I expected this class to be fairly interested in learning the material since this seemed to be an optional math class; that is not, however, what I experienced. I'm not sure if it was the early hour or senioritis kicking in, but there were very few times that the class was engaged with learning at all. Many times they would be playing on their phones, having side conversations, or even sleeping! This was a new challenge for me to overcome since the first two classes I started teaching were fairly engaged.

One student that was the epitome of disengaged was James. James spent just about every class sleeping in the corner of the room. No matter what I did to make the class more exciting or how many times I would try and talk with James, he would always spend the class sleeping. It even got to a point where he just stopped doing work. After spending an extensive amount of time reviewing the Geometric and Poisson Distributions I assigned a test. James spent the entire class sleeping and at the end of the class passed in a blank test. I was truly stunned as to how to handle this situation and relied greatly on my mentor to lead my in handling this particular student. Eventually we sat down and had a talk with James and it seemed to help, at least for the remainder of my time at Doherty.

A major problem I noticed with the disengaged class is that it is hard to figure out if the class fully understands the material because they tend not to respond to questions or comments. I understood this first hand when I was pretty confident that the class understood the material and gave them a test to judge their understanding on the Geometric and Poisson Distributions. When I was grading the tests afterwards it appeared that the class was not comfortable with the material

at all.  In fact, two of the students, Noah and John basically made up answers together and gave

no work for credit. The next day in class we had a discussion and I informed the class that we

were going to thoroughly review the two distributions the test was on and when they felt ready

they would have another test to replace this grade.  After the talk, the class seemed to focus more

and was definitely more prepared for the next test and all the grades improved significantly.

Both versions of this test can be found in the "Tests and Homework" section of the appendix.

## Numeracy – Second Period

My mentor at Doherty taught two classes of Numeracy, one during second period and

one during sixth.  When I began my student teaching I observed both and noticed some

similarities in behavior but also noticed that the sixth was a much bigger challenge with

discipline.  While observing I spent some time one-on-one with particular students who were

struggling in the sixth period class.  However, due to time constrictions my mentor suggested I

only take over the teaching of the second period Numeracy class.  This Numeracy class was the

final class I began teaching as a way to ease me into the difficulties it was going to give me.  The

class was made up of twenty-four freshmen; eleven males and thirteen females.  Many of these

students had IEPs that I had to work with and understand how to include those learning situations

into the everyday classroom.

Discipline-wise this was absolutely my hardest class to teach.  One of the most notable

problems was the use of cell phones in the classroom; sometimes hidden and sometimes not so

much!  Unfortunately this was what the class was used to since my mentor rarely scolded them

for having their phones out so there was very little I could do about this situation.  My mentor

did make an honest effort to crack down on the rules as it got closer to my teaching time in order

to make it an easier transition for me; however, it was very difficult to change the nature of the classroom after it had already been so well established.

As mentioned previously, one of my grading tactics in this class was to give grades based on daily participation and effort in the number strips handed out and the assignments we completed in class. Since there were so many discipline problems in this class very few students were excited to come up to the board and answer questions. The few that were excited to do it kept coming up over and over, allowing other students to slip through the cracks and not contribute to class day after day. After noticing this I took to labeling each problem on the board with a student's name and they were required to come to the board and solve the problem and that contributed to their participation grade for the day. If they were stuck I would go up and help walk them through each problem step by step. Helping them when they got stuck not only helped them to feel like they were truly accomplishing the material and contributing, but it also helped me to see where exactly they were struggling with the most. Knowing where the students were having difficulties allowed me tailor my teaching to a way that would be most helpful to them.

In addition to the cell phone issue, there was one other major challenge involving this class and that concerned my age and authority over them. While this class was actually the youngest, seeming as it was made up of all freshmen, they were the ones who tested the age boundaries. At times it definitely felt as if they respected me less because they knew I was still in college. I feel that teachers can connect better with students if they have some sort of relationship with them; however, this class made it difficult to form that relationship. Whenever I would act as a friend and try and help them out they seemed to try and take advantage of the situation.

# Advanced Algebra II – Fourth Period

My fourth period Advanced Algebra II class was the first I taught as a student teacher. The class consisted of twenty nine students; thirteen males and sixteen females. This was definitely one of the easiest classes I taught while at Doherty since it was more of an honors class and the students tended to enjoy learning. There were, of course, exceptions to this generality. One student, Arnold, was especially disinterested in the class and almost never completed a homework assignment or participated in class. This was a difficult road block in the class but was a good situation to be sure I was experiencing all of what being a teacher is about.

This class was one that I was definitely able to allow the students to work in groups as they all seemed to have a friend or two in the class. While this can sometimes lead to unproductive work times, it tended to be beneficial in this class where each student would usually get their work completed. One thing I noted about this class was their tendency to expect that late work would be counted for full credit. This was not something I was anticipating on allowing but I felt more obligated to since this was the style of class they were used to. Typically I would work with the students to let them know what they were missing and then give them almost full credit if they turned it in by the end of the grading period.

Another thing I did notice in this class was a lot of side conversations occurring while I was teaching. Two students who seemed pretty close were Braily and Alicia. It was pretty typical that the two girls could be found in the back of the class having their own conversation. However, I did notice that if I called them out on it and asked them to pay attention I generally didn't have any more problems for the rest of that period. I also noticed that once they realized we were approaching a test or quiz they would begin to focus more and really demonstrated that they were strong students who liked to understand the topics.

There was one student in particular that never truly seemed to pay attention or participate in class in any way.  Felix seemed very removed and uninterested during class time but when I would go around checking homework it was always completed and correct.  Based on this it was no shock that he consistently maintained an A average in the class and understood the material quite well.  Despite his apparent lack of attention, he always succeeded and proved that he truly was learning.

Alan was another student that posed a bit off a challenge.  There were times during the class that he would be absent for several days in a row, making it difficult for him to keep up with the work or understand the material because he missed so much.  The best way I found to handle this situation was to allow him to make up any work that he missed and try to have one-on-one sessions with him to attempt to catch him up on the work he had missed.  Unfortunately, his absences continued to occur and made it very difficult to continually catch him up on material we had covered days ago.

## Advanced Algebra II – Fifth Period

I began teaching the fifth period Advanced Algebra II class on the same day I began the fourth period Advanced Algebra II class.  This made for an easy transition because whatever I felt needed improvement after the first class could be improved upon during this class.  The fifth period class consisted of twenty-three students; ten males and thirteen females.  While the fourth period Advanced Algebra II class was definitely less challenging than others, the fifth period class was easily the most fun and interested in learning.  The two classes, fourth and fifth period, were very similar in academic level; however the disposition of fifth period was much more open to learning and was easier to connect with on the teacher to student level.

While this class may have been the most enjoyable to teach, it definitely came with its challenges as well. One specific incident really demonstrates this involving a student named Evangelo. Evangelo was pretty intelligent but rarely wanted to put the effort in to show that he understood the material. You could definitely tell that Evangelo was far more interested in hanging out with his friends or talking than actually paying attention in math class. He would sometimes struggle with the homework but then, once I took the time to explain it again, he wound understand and be able to answer every question correctly. Towards the end of my time student teaching I assigned a test on radicals, a topic that Evangelo had paid very little attention to. During the test I noticed that he wasn't working all that diligently and was sharing a book with the student next to him, Eathan. When Evangelo passed in his test he had all the answers with no work, something I had made very clear wouldn't be accepted. I consulted with my mentor and together discussed the situation with Evangelo. We expressed our concerns that Evangelo acted suspiciously during the test and then passed in a test with no work so he would be receiving no credit. Evangelo denied any implications of cheating almost immediately until my mentor called Eathan out into the hall and told him he would also be receiving a zero for helping Evangelo cheat. At this point Evangelo admitted that he copied Eathan's answers but Eathan had nothing to do with it so he should receive full credit. This experience taught me how to handle a situation where it appears that a student has been cheating. I allowed Evangelo to take a make-up test for partial credit in order to replace his zero and he showed improvement this time in his understanding of the material.

Another challenge this class presented occurred in a few of the students, mainly Luis, Daniel, and Menhel. All three boys showed a sincere desire to understand the material but simply struggled comprehending. Their struggles taught me that I needed to find different ways

to explain the material and that not everyone understands the material after one explanation and occasionally they need it explained in multiple ways. During individual work time I would attempt to meet with any students struggling and these three students were typically among the ones I would talk with. At that time I would try to work through examples with the students and have them repeat back to me how to solve the problems until I could pin point which part of the process they were struggling with the most. One of my proudest moments was towards the end of my time at Doherty. Luis had been working really hard to do well on the radicals test I had assigned and I could tell he was nervous his hard work wasn't going to pay off. I graded his test first and to my delight I found that he had gotten an A! Seeing the relief and excitement that crossed his face when he found out that he got an A made every challenge that student teaching presented me with well worth it. The radical test referenced here and in the above situation with Evangelo can be found in the "Tests and Homework" section of the appendix.

# Conclusion

Massachusetts is trying very hard to better their students' learning experience through the Education Reform Act of 1993 and the Professional Standards that all teachers need to adhere to. Even as a student teacher, I was expected to live up to these standards and achieve competency in each of them. Some standards are definitely harder than others but there are some that come quite naturally. Through the variety of teaching styles I tried to utilize, the numerous lesson plans I created, and the experiences I had while at Doherty I feel I displayed each of these standards in one way or another. My student teaching was an incredible experience that taught me a lot. I discovered ways of teaching I enjoyed, and ways that were unsuccessful. I was even able to learn what not to do in terms of discipline and classroom structure. Overall, those standards expected of all Massachusetts teachers are encouraging them to be the best they can be for their students.

# Resources

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# Appendix

## Lesson Plans

Weekly Lesson plan for Advanced Algebra II – Periods 4 & 5

| Date | In Class Activities | Homework |
|---|---|---|
| Monday, Feb. 25 | • Pass back quizzes for quadratic formula<br>• Review Completing the Square – See notes for specifications<br>• Complete half of worksheet in class and go over on the board – have students put their answers on board and explain their solutions | • Finish worksheet from in class - will review answers on Tuesday |
| Tuesday, Feb. 26 | • Finish reviewing worksheet that was completed for homework – again have students defend answers on board<br>• Open discussion and questions about the upcoming test on the four ways to solve a quadratic equation<br>• Go over examples of problems that will be on the test | • Chapter test from book Page 323 #2-24 even<br>• Think of any more questions or examples to go over tomorrow |
| Wednesday, Feb. 27 | • Go over answers to the first half of chapter test. List answers and then ask for specific questions on the material.<br>• Discuss any questions or examples that people need help with. If no questions, will go over examples from the book that wasn't assigned as homework | • Finish the chapter test from page 323 (#1-23 odds)<br>• Check answers and try to figure out the reasons for any discrepancies.<br>• Will collect homework tomorrow before the test to grade based on effort |
| Thursday, Feb. 28 | • Test on four methods to solve quadratic equations | • None |
| Friday, March 1 | • First half of class: leave time for students to finish test if necessary.<br>• Second half: Start the chapter on radicals and how they can also relate to quadratic formula. List initial rules with examples to discuss next week. | • None |

<u>**Advanced Algebra 2 Lesson Plan**</u>

<u>Section 4.8</u> – Quadratic Formula

**Objectives:**   SWBAT use the quadratic formula to solve a quadratic equation
　　　　　　　　SWBAT make connections between the quadratic formula and factoring
　　　　　　　　SWBAT decide what kind and how many solutions there will be

**Lesson:**
- Put example on board and have class attempt to factor it:
    - $x^2+2x+5 = 0$
    - Once they realize it is not factorable introduce that there is another method to use
- Write quadratic formula on board in color coordination including standard form of equation
    - $ax^2 + bx + c$
    - $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
- Re-do example from above with quadratic formula
- $2x^2+11x+15=0$
    - Do Example with factoring
    - Re-Do with quadratic formula
- Do example on board with quadratic formula :   $2x^2-4x-1=0$
- List the following examples on the board for the students to try. If struggling let them keep trying and will then take questions and go over the answers
    - $x^2-3x+2 = 0$
    - $3x^2+x-4=0$
    - $3x^2+2x = 0$
    - $-x^2+3x-4 = 2$
    - $3x^2+2x = x^2+x+1$
    - $x^2-2x+1 = 0$
- The <u>discriminant</u> of the quadratic formula is: $b^2$-4ac
    - If the discriminant is $> 0$ there are 2 *real* solutions
    - If the discriminant $= 0$ there is 1 *real* solution
    - If the discriminant $< 0$ there are two imaginary solutions (these contain *i*)
- For those problems we did, what are the values of the discriminant?
    - $x^2-3x+2 = 0$
    - $3x^2+x-4=0$
    - $3x^2+2x = 0$
    - $-x^2+3x-4 = 2$
    - $3x^2+2x = x^2+x+1$
    - $x^2-2x+1 = 0$
    - Do these rules make sense with the answers we got?
        - ie. Are there 2 real answers for all the disc. $> 0$?

**Homework**:   Worksheet B # 8-26 even

**Statistics Lesson Plan:** Normal Distribution and Empirical Rule

**Objectives:** SWBAT identify the mean and standard deviation of the normal distribution
SWBAT describe the three area breakdowns of the Empirical Rule
SWBAT calculate the probability in reference to the normal distribution

**Lesson:**

- Normal Distribution:
  - o Most important distribution in statistics
  - o A continuous probability distribution for the random variable x
  - o The graph is used a lot and is called the <u>normal curve</u>
  - o Has the following properties
    - Mean, median, and mode are all equal
    - Normal curve is bell shaped and is symmetric about the mean
    - Total area under the curve is equal to one
    - Approaches but never touches the x-axis as it gets further and further away from the mean.
  - o Mean: $\mu$ (mu)
  - o Standard Deviation: $\sigma$ (sigma)
    - Always positive
    - The larger $\sigma$ is the more spread out the curve is
  - o The following curve demonstrates two different normal curves
    - Curve B has a higher standard deviation than curve A
    - The mean is found in the middle of the curve and is the highest point of the graph
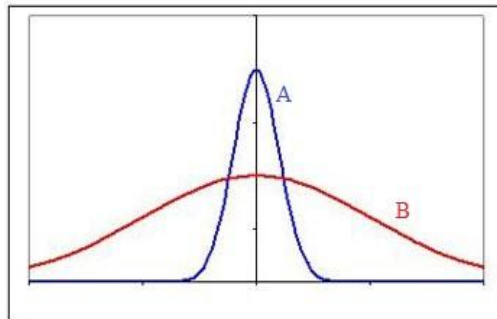


- Empirical Rule:
  - o In a normal distribution with mean $\mu$ and standard deviation $\sigma$, you can approximate the following areas under a normal curve:
    - 68% between $\mu-\sigma$ and $\mu+\sigma$
    - 95% between $\mu-2\sigma$ and $\mu+2\sigma$
    - 99.7% between $\mu-3\sigma$ and $\mu+3\sigma$
  - o If the total area under the curve is always 1, then you can translate the percentages to 68% -> 0.68, 95% -> 0.95, 99.7% -> 0.997
- Do the following example on the board:
  - o If you know IQ scores are normally distributed with $\mu=100$ and $\sigma=15$, estimate the probability that a random IQ will be between 70 and 115.
- Have the students work on pg. 198 numbers 5-7 in class and go over

**Homework:** Bookwork – pg. 198 #8-14

**<u>Numeracy Lesson Plan:</u>** Solving two-step equations

**Objectives:**    SWBAT solve for a variable in a two step equation.
                   SWBAT substitute that solution into the original equation and check that it works.

**Lesson:**
- Review what a variable is and how to identify it in an equation
    ○ Usually a letter (x, y, z, etc.)
    ○ Reminder: in order to solve for a variable it needs to be an equation (with an equal sign, or inequality sign) and not just an expression
- Begin with one-step equations – Do the following on the board with assistance from the class:
    ○ x-3=5
    ○ 4+x=2
    ○ 12-y=10
    ○ 2y=-4
    ○ 5z=25
    ○ -3z=-27
- Let students do the following on their own and then have them write their solutions on the board (put names up next to each problem so everyone gets a turn):
    ○ -x-5=-2
    ○ 7y=23
    ○ 4z=-3
    ○ ½ x=5
    ○ 3y=¾
    ○ -1+z=⅗
- Using the information we've reviewed in the past few examples, try your best to solve for x in the following equation:
    ○ 2x-7=5
- Once the class either succeeds or has struggled long enough with above example explain it to the class
    ○ If one student is able to do it and explain it have them come to the board to show their work
- Go over the following three examples together:
    ○ 3x+5=-4
    ○ -2x-10=6
    ○ ¼ + 2x = ¾

**In-Class Work:** Solving 2-step equation worksheet – after 15 minutes put the first 5-10 problems on the board and have students come up and do them.  Will review entire worksheet tomorrow.

# Tests and Homework

Probability and Statistics Period 1                Name:_____
Geometric and Poisson Distribution Quiz           Date:_____

**Please show all work on a separate sheet of paper.**

1. Peter is a good baseball player and has gotten a hit 13 out of 40 times that he has been up to bat this year.  His uncle has never seen him play and is coming to his game today.  What is the probability that he:
   a. Gets a hit in his first at bat?
   b. Gets a hit in his second or third at bats?
   c. Does not get a hit in the four at bats he has in the game?

2. A soda company claims that the probability that you will win a prize with the code under your cap is 31.6%.  If you buy one soda a day, what is the probability that:
   a. You will win on your fifth soda?
   b. You will win in your first three sodas?
   c. You will win after your first five sodas?

3. Brett is late to school about seven times a year.  What is the probability he will be late:
   a. Five times next year?
   b. More than four times next year?
   c. Less than three times next year?

4. A high school football team scores an average of three touchdowns a game.  What is the probability that they will score:
   a. Seven touchdowns in their next game?
   b. Less than four touchdowns in their next game?
   c. More than two touchdowns in their next game?

Probability and Statistics Period 1         Name:_____

Geometric and Poisson Distribution Quiz #2     Date:_____

**Please show all work on a separate sheet of paper.**

1. Tracy gets about four aces in any tennis match that she plays.  Find the probability of her getting:
    a. Two aces in her next match.
    b. More than three aces in her next match.
    c. Less than two aces in her next match.

2. A long golf put is considered over 10 feet.  A specific golfer makes 2 of every 9 long putts in a round.  What is the probability that the golfer will make their first long putt:
    a. On the fifth long putt in a round?
    b. In the first three long putts in a round?
    c. After the fourth long putt in a round?

3. The average number of snow days in a school year is 5.  What is the probability of having:
    a. Three snow days next year?
    b. Less than two snow days next year?
    c. More than four snow days next year?

4. A certain soda company places prizes under the cap.  They claim that the probability of winning is 24.3%.  If you purchase one soda a day, what is the probability that you will win:
    a. On your seventh soda?
    b. Before your third soda?
    c. After your second soda?

**Graphing: State how many times the graph crosses or touches the x-axis and where.** *Sketch* **the graph.**

1. $y = x^2 - 8x + 16$

2. $y = 2x^2 - 5x - 7$

Quadratics Test (page 2)
**Solve for x by <u>factoring</u>:**

    3.  $x^2 + 5x - 24 = 0$

    4.  $6x^2 - 25x - 9 = 0$

**Solve by using the <u>Quadratic Formula</u>:**

    5.  $x^2 + 8x - 3 = 0$

    6.  $2x^2 - 3x + 7 = 0$

Quadratics Test (page 3)
**Solve by <u>Completing the Square</u>:**

7.  $x^2 + 8x - 17 = 0$

8.  $5x^2 - 25x + 15 = 0$

**Solve by the method of your choice:**

9.  $6x^2 - 8x = -3$

10.  $3x^2 + 7x = -4$

Advanced Algebra 2  
Radical Quiz

Name:_____

Date:_____    Period:_____

**Simplify completely.  Your answer should only contain positive exponents and no radicals in the denominator.**

1.  $\dfrac{96^{\frac{1}{4}}}{6^{\frac{1}{2}}}$

2.  $4(x^{\frac{1}{2}}y^{\frac{3}{8}}z^2)^4 + 7(x^4y^3z^{16})^{\frac{1}{2}}$

3.  $\sqrt[4]{256x^2y^6z^8}$

4.  $5\sqrt[3]{625x^7y^2z^3}$

Radical Quiz (Page 2)

5.    $\sqrt[3]{189} \bullet \sqrt[3]{56}$

6.    $\sqrt[5]{x^3y^7z^2} \bullet \sqrt[5]{x^4yz^{10}}$

7.    $-\sqrt[6]{3} + 7\sqrt[6]{3}$

8.    $\sqrt[4]{162} + 4\sqrt[4]{512}$

9.    $\sqrt{x^3} + \sqrt{9x^3}$

10.    $\sqrt[3]{135} - \sqrt[3]{40}$

Bonus (5 points): What college does Ms. Labbay attend?

Advanced Algebra II – Quadratics Homework

**LESSON 4.8**

# Practice B

For use with pages 292–299

**Find the discriminant of the quadratic equation.**

1. $x^2 - 3x + 5 = 0$

2. $2x^2 + x + 2 = 0$

3. $4x^2 - 9x + 2 = 0$

4. $-3x^2 + 6x - 3 = 0$

5. $3x^2 + 3x - 1 = 0$

6. $7x^2 - 4x + 5 = 0$

**Find the discriminant and use it to determine if the solution has *one real*, *two real*, or *two imaginary* solution(s).**

7. $x^2 + 4x + 3 = 0$

8. $x^2 - 2x + 4 = 0$

9. $x^2 - 2x + 1 = 0$

10. $3x^2 + 2x - 1 = 0$

11. $-x^2 - x = 4$

12. $5x^2 - 4x + 1 = 3x + 4$

**Use the quadratic formula to solve the equation.**

13. $x^2 + 4x - 2 = 0$

14. $2x^2 - 5x - 2 = 0$

15. $x^2 + 2x = 4x$

16. $-6x^2 + 3x + 2 = 3$

17. $-x^2 + 1 = -5x^2 + 4x$

18. $2(x - 3)^2 = -2x + 9$

19. $2.5x^2 - 2.8x = 0.4$

20. $4.8x^2 = 5.2x + 2.7$

**Solve the equation using the quadratic formula. Then solve the equation by factoring to check your solution(s).**

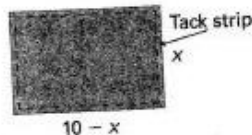21. $x^2 - 2x - 24 = 0$

22. $x^2 - 2x + 1 = 0$

23. $2x^2 - 9x + 9 = 0$

24. $6x^2 + 17x + 5 = 0$

25. $10x^2 + x = 2$

26. $6x^2 = 5x + 6$

27. **New Carpet** You have new carpeting installed in a rectangular room. You are charged for 28 square yards of carpet and 60 feet (20 yards) of tack strip. Tack strip is used along the perimeter to secure the carpet in place. Do you think these figures are correct? *Explain* your answer.

Tack strip

$x$

$10 - x$

**In Exercises 28–31, use the following information.**

**Launched Object** An object is launched upward with an initial velocity of 64 feet per second from a platform 80 feet high.

28. Write a height model for the object.

29. How many seconds until the maximum height is reached?

30. What will be the maximum height?

31. How many seconds until the object hits the ground?

Advanced Algebra II – Radical Homework

**Do all work on separate paper.**

**Simplify.**

1) $2\sqrt{7} + 3\sqrt{112}$

2) $-2\sqrt{54} + 3\sqrt[3]{6}$

3) $2\sqrt[3]{40} - 3\sqrt{5}$

4) $2\sqrt{6} - \sqrt{54}$

5) $-\sqrt[6]{128} - 4\sqrt[6]{128}$

6) $\left(49m^2\right)^{\frac{1}{2}}$

7) $\left(k^9\right)^{\frac{1}{3}}$

8) $\left(x^{12}\right)^{\frac{1}{3}}$

9) $\left(p^6\right)^{\frac{3}{2}}$

10) $\left(16x^6\right)^{-\frac{3}{2}}$

11) $-\sqrt{144x^2yz^3}$

12) $8\sqrt{245m^2np^4}$

13) $-7\sqrt{448x^3y^3z^2}$

14) $-6\sqrt[3]{-16x^2y^7z^5}$

15) $-3\sqrt{54x^2yz^3}$

16) $\left(64x^6\right)^{-\frac{1}{2}}$

17) $\left(343n^6\right)^{\frac{2}{3}}$

18) $\left(v^6\right)^{\frac{1}{3}}$

19) $\left(4m^6\right)^{\frac{1}{2}}$

20) $\left(8m^6\right)^{\frac{2}{3}}$

Algebra 2

Assignment

Name_____

Date_____ Period____

ID: 1

**Perform the indicated operation.**

1) $f(n) = 3n + 1$
$g(n) = -2n^2 + 6n$
Find $f(n) - g(n)$

2) $f(n) = 2n + 3$
$g(n) = 4n - 2$
Find $f(n) + g(n)$

3) $g(x) = 4x - 1$
$f(x) = -x^2 + 4$
Find $g(x) - f(x)$

4) $h(t) = -2t - 1$
$g(t) = t^2 - 2$
Find $h(t) \div g(t)$

5) $g(t) = 4t - 5$
$h(t) = t^2 + 5$
Find $g(t) \cdot h(t)$

6) $g(t) = 2t^2 - 3t$
$h(t) = t - 2$
Find $g(10) \div h(10)$

7) $g(n) = n^2 - 4$
$h(n) = 4n - 4$
Find $g(-5) - h(-5)$

8) $f(a) = 2a - 1$
$g(a) = 3a - 5$
Find $f(-6) + g(-6)$

9) $f(n) = n^2 + 4n$
$g(n) = n + 2$
Find $f(4) \cdot g(4)$

10) $g(a) = 4a + 3$
$f(a) = 3a^2 + a$
Find $g(5) \div f(5)$

11) $f(x) = -2x - 2$
$g(x) = x^3 - 2x^2$
Find $f\left(\dfrac{x}{3}\right) \div g\left(\dfrac{x}{3}\right)$

12) $h(n) = 2n - 4$
$g(n) = 2n$
Find $h(n - 1) - g(n - 1)$

13) $g(n) = n^3 + 4n^2$
$h(n) = 2n - 5$
Find $g(3n) \cdot h(3n)$

14) $g(x) = 2x - 1$
$h(x) = x^3$
Find $g\left(\dfrac{x}{4}\right) \cdot h\left(\dfrac{x}{4}\right)$

Advanced Algebra II - Functions Homework (page 2)

15) $g(t) = 3t + 3$
$h(t) = -3t - 5$
Find $g(t^2) \div h(t^2)$

16) $h(t) = 2t^3 + 4$
$g(t) = 3t + 1$
Find $(h \circ g)(t)$

17) $g(t) = 3t - 2$
$h(t) = 4t - 4$
Find $(g \circ h)(t)$

18) $f(x) = x - 1$
$g(x) = x^2 - 5x$
Find $(f \circ g)(x)$

19) $g(x) = x + 3$
$f(x) = 4x - 5$
Find $(g \circ f)(x)$

20) $g(x) = -x^2 + 4x$
$h(x) = 3x - 5$
Find $(g \circ h)(x)$

21) $f(n) = -n + 3$
$g(n) = -3n^2 + 4n$
Find $(f \circ g)(-5)$

22) $h(n) = 4n - 4$
$g(n) = -2n$
Find $(h \circ g)(-5)$

23) $h(t) = -2t - 3$
$g(t) = t - 3$
Find $(h \circ g)(6)$

24) $h(t) = 2t - 4$
$g(t) = -3t - 4$
Find $(h \circ g)(2)$

25) $g(n) = 3n + 5$
Find $(g \circ g)(2)$

26) $f(a) = 4a - 4$
$g(a) = a^2 + 2$
Find $(f \circ g)\left(\dfrac{a}{4}\right)$

27) $f(t) = 3t + 2$
$g(t) = t^3 - 4t$
Find $(f \circ g)(2 + t)$

28) $f(x) = -2x + 3$
$g(x) = x - 1$
Find $(f \circ g)(4x)$

29) $g(x) = x^2 - 4$
$h(x) = x - 4$
Find $(g \circ h)(x + 2)$

30) $f(n) = n^2 + 3$
$g(n) = n + 3$
Find $(f \circ g)(n - 3)$

55

## Activities

# Radical Bingo!

| B | I | N | G | O |
|---|---|---|---|---|
| 4√3 | -2√2 | 4√7xy | 200 | 5√7 |
| 8√7 | 6ab√3b | 12√14 | 16√5 | -3 |
| 29√2 | √26 | Free Space ! | 5z√3xy | 2√2 |
| 6∛4 | 3∛6 | 12 | 15√2 | 3xy√2xz |
| 25 | 4√5 | 4b√2a | 2 | 8 |

Numeracy Number Strip (Front and Back)

SUPER STRIP I

| 1 | 2 + 9 = |
| 2 | 8 + 7 = |
| 3 | 6 + 4 = |
| 4 | 5 + 9 = |
| 5 | 6 + 3 = |
| 6 | 5 + 8 = |
| 7 | 6 + 5 = |
| 8 | 8 + 6 = |
| 9 | 8 + 8 = |
| 10 | 6 + 9 = |
| 11 | 9 + 7 = |
| 12 | 4 + 9 = |
| 13 | 6 + 6 = |
| 14 | 7 + 3 = |
| 15 | 3 + 6 = |
| 16 | 2 + 7 = |
| 17 | 9 + 3 = |
| 18 | 7 + 7 = |
| 19 | 9 + 4 = |
| 20 | 8 + 5 = |
| 21 | 4 + 8 = |
| 22 | 3 + 4 = |
| 23 | 3 + 8 = |
| 24 | 6 + 8 = |
| 25 | 2 + 4 = |
| 26 | 5 + 4 = |
| 27 | 8 + 3 = |
| 28 | 9 + 8 = |
| 29 | 4 + 5 = |
| 30 | 3 + 5 = |
| 31 | 7 + 5 = |
| 32 | 3 + 9 = |
| 33 | 8 + 9 = |
| 34 | 2 + 5 = |
| 35 | 5 + 6 = |
| 36 | 4 + 6 = |
| 37 | 7 + 8 = |
| 38 | 9 + 9 = |
| 39 | 9 + 5 = |
| 40 | 2 + 6 = |
| 41 | 7 + 6 = |
| 42 | 8 + 4 = |
| 43 | 3 + 7 = |
| 44 | 6 + 7 = |
| 45 | 2 + 8 = |
| 46 | 4 + 7 = |
| 47 | 9 + 6 = |
| 48 | 7 + 4 = |
| 49 | 5 + 7 = |
| 50 | 7 + 9 = |

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SUPER STRIP P

| 1 | 15 - 7 = |
| 2 | 15 - 9 = |
| 3 | 10 - 7 = |
| 4 | 11 - 9 = |
| 5 | 10 - 8 = |
| 6 | 6 - 4 = |
| 7 | 13 - 9 = |
| 8 | 14 - 5 = |
| 9 | 9 - 3 = |
| 10 | 12 - 7 = |
| 11 | 12 - 6 = |
| 12 | 11 - 7 = |
| 13 | 13 - 4 = |
| 14 | 15 - 8 = |
| 15 | 16 - 8 = |
| 16 | 13 - 7 = |
| 17 | 12 - 9 = |
| 18 | 14 - 8 = |
| 19 | 14 - 9 = |
| 20 | 8 - 6 = |
| 21 | 12 - 5 = |
| 22 | 13 - 5 = |
| 23 | 17 - 9 = |
| 24 | 9 - 5 = |
| 25 | 11 - 5 = |
| 26 | 16 - 7 = |
| 27 | 16 - 9 = |
| 28 | 7 - 4 = |
| 29 | 10 - 4 = |
| 30 | 11 - 4 = |
| 31 | 11 - 8 = |
| 32 | 11 - 6 = |
| 33 | 14 - 6 = |
| 34 | 12 - 4 = |
| 35 | 7 - 5 = |
| 36 | 10 - 6 = |
| 37 | 8 - 5 = |
| 38 | 9 - 7 = |
| 39 | 18 - 9 = |
| 40 | 14 - 7 = |
| 41 | 9 - 4 = |
| 42 | 12 - 8 = |
| 43 | 11 - 3 = |
| 44 | 15 - 6 = |
| 45 | 17 - 8 = |
| 46 | 10 - 3 = |
| 47 | 13 - 8 = |
| 48 | 12 - 3 = |
| 49 | 13 - 6 = |
| 50 | 9 - 6 = |

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