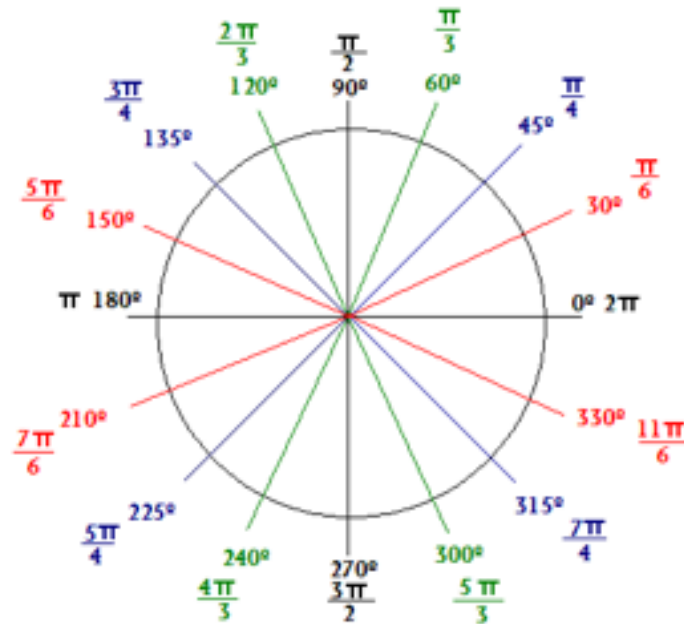


# Massachusetts Educators

## *Mathematics as a Universal Language*



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January 20, 2016

In this paper I discuss my student teaching experience at Doherty Memorial High School. Doherty Memorial is a diverse high school found in Worcester, Massachusetts. I look at the background of the students, the school, and education in Massachusetts as a whole. This paper also includes evidence of my understanding of the standards of being an educator in Worcester, Massachusetts. The Teaching Practicum was completed during my junior year at Worcester Polytechnic Institute.

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# Chapter One

## Behind Worcester Public Schools

Mark Twain once said, “I have never let my schooling interfere with my education.” By this he mean’t that education isn't just the responsibility of the educator, but the responsibility of the student as well. For roughly three and a half months I had the opportunity to be an educator at Doherty Memorial High School in Worcester, Massachusetts. As someone who sat in a seat as a student in high school four short years ago, I have a unique perspective on high school education and and an entire new respect for teachers.

It’s difficult to sum up what the word “education” actually means. What does it mean to teach, and what does it mean to learn? Teaching, in my opinion, is not just about emphasizing certain basic skills and classes such as math and science, but it’s more about using intellect and creativity to inspire students to want to continue their education. Too often education comes across as an inconvenience or a chore, but it doesn’t have to be, education can be a fun way to further one’s measure and value of knowledge. To learn does not necessarily mean to absorb the information being tossed one’s way. Learning can be obtained by yes, absorbing the information, but also questioning it, studying it, and find where it’s applicable in everyday life. Students are more likely to have a desire to learn and pay attention if they can see the use behind the information being taught, though this is easier said then done. How might an english teacher

incorporate this to Shakespeare? Or a science teacher with chemistry? After all, not all of these students want to grow up to be writers or chemists. As a math teacher, I made an honest attempt to relay information to my students in such a way that they could not only learn it, but also understand why they're learning it and appreciate the value of the material.

Now, let's take a hard left turn. Imagine a musical attempting to teaching heavy metal to a church choir. I'm not saying this isn't an unachievable possibility, I'm actually emphasizing that for best results it's crucial to recognize the audience you're attempting to reach. Now I taught four classes, two algebra 2 classes, and two honors geometry classes, and each one of them required different tactics to properly see that the correct information was received by my students.

As of 2015, there are 45 schools in the Worcester Public Schools system, containing just over 25,000 students. Doherty Memorial High School has approximately 1400 students, creating a student teacher ratio of 14 to 1, the class size I taught being 25 to 1. The table below shows the demographics for the Worcester Public Schools system, the highest ethnicity being hispanic.

Demographics of the Worcester Public Schools System, 2015-2016

Enrollment by Race/Ethnicity (2015-16)		
Race	% of District	% of State
African American	14.9	8.8
Asian	7.5	6.5
Hispanic	40.8	18.6
Native American	0.2	0.2
White	32.5	62.7
Native Hawaiian, Pacific Islander	0.0	0.1
Multi-Race, Non-Hispanic	4.1	3.2

This diverse population in our public school system is positive from my point of view as it allows students to interact among various social fields and acquire new ways of cognitive thinking and processing knowledge. From an educators point of view it introduces obstacles such as working around different cultures, specifically the language barrier it can create. Without going into too much depth, these students are referred to as ELL, or English Language Learners. Lesson plans should be written and coordinated with this in mind, in order to teach the entire class as one and not just most of the students or individual students. With such a diverse student body how many of these students students are ELL? The table below shows the statistics for the entire Worcester district:

Worcester Public School System ELL Statistics, 2015-2016

Title	% of District	% of State
First Language not English	50.8	19.0
English Language Learner	38.4	9.0
Students With Disabilities	19.1	17.2
High Needs	74.3	43.5
Economically Disadvantaged	52.4	27.4

These numbers may be on the higher side for Doherty Memorial, as the classes I taught contained roughly 8-12% ELL. Working amongst these diverse groups of students requires extra effort from both the students and teachers. The greatest challenges that I came across while teaching was trying to reach each student equally, and the hardest thing for me accept is that it's not always possible. As an educator you can't devote too much attention to individual students without taking away time from other students. Ways to work around this are to stay after to work

with students one on one. As a student teacher this wasn't always feasible for myself because after teaching at the high school I had to resume classes at WPI. For my students it could be even more difficult, whether the issue was extracurricular activities, or simply finding a ride home. One of the biggest reasons students couldn't stay after, however, was because many of my students had to go to work after school.

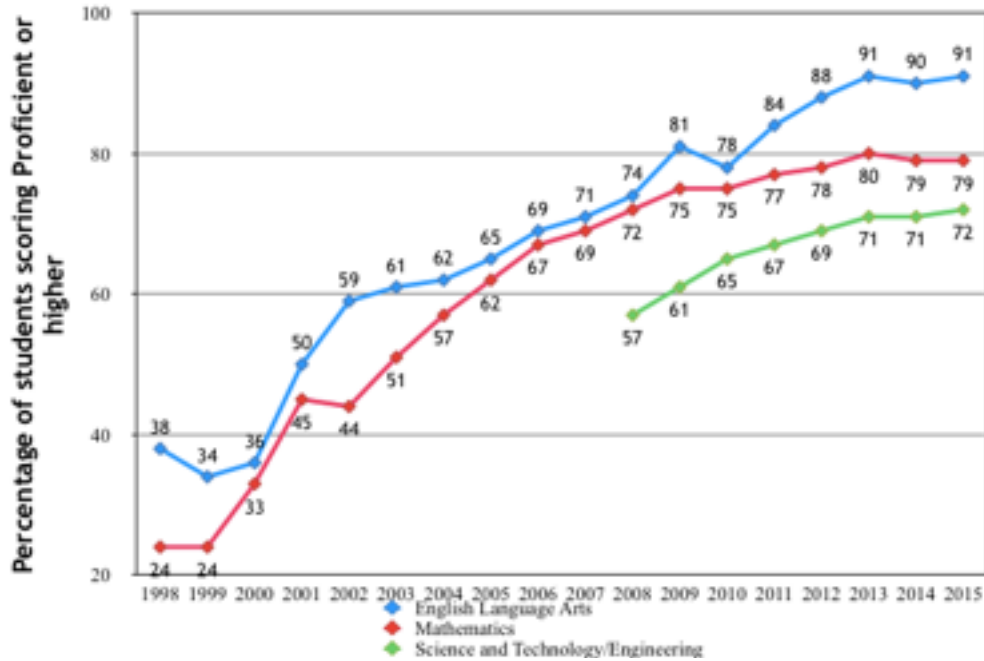
Of the 1400 students enrolled at Doherty Memorial, 8% qualify for reduced lunch, and an enormous 45% qualify for free lunch. Coming from a household where money is tight can be hard on high school students. Instead of putting the full focus on academics they also must divert their attention to finances. This can take away from many opportunities available to students with a higher level of income. Firstly, as stated earlier, working a job after school can take away the ability to stay after school for extra help. Secondly, it can take away the ability to participate in extracurricular activities and sports. Overall students that participate in these after school activities result in a higher level of academic motivation, better grades and standardized test scores, and higher self concept. It helps students stay connected within the school and help develop basic social skills. When balanced appropriately with academics, these extracurricular activities can raise self-esteem and create school spirit amongst faculty and peers.

From personal experience I noticed that students at a financial disadvantage were less likely to have their homework completed on time if at all. I believe the main reason for this is that most of these students expect to work a minimum wage paying job after high school and thus do not grasp the educational value as much as other students. It's unfortunate that students

feel this distraught so early on, that college truly isn't in their scope. This is why I am a firm believe that the best thing any good teacher can do is inspire their students. Strive to be better, regardless of what society may expect. One's level of education should never be determined by money, but rather by how hard they are willing to work and how much they want to achieve inspire of money. The teacher needs to make this apparent to each and every student that cross their path. As students get older, this task grows much more difficult.

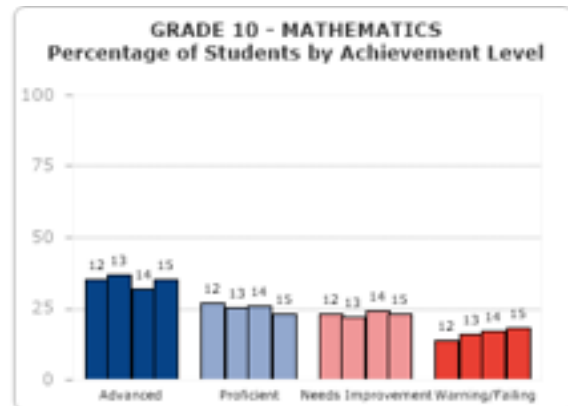
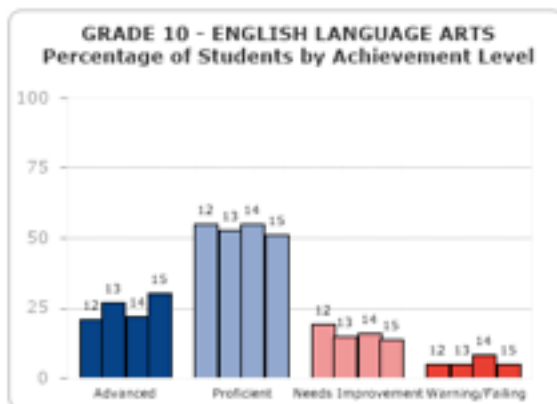
One of the most important question any educator, parent or even students can ask may be "how is intelligence measured?" In the public school system the main measure of intelligence is through testing. This I believe to be one of the fundamental flaws with the system, after all tests don't measure all aspects of one's ability to think. They don't measure ability or how the mind processed information, rather they measure how well a student is able to memorize information. This isn't to say that all students merely remember the information, write it down on a test, then forget it, but in order for students to hold onto the knowledge and appreciate it's value they'll have to go the extra mile. Standardized tests do serve their purpose though, because in the end it is important to see what students have attained and what academic level they're on in regards to their peers. The Worcester Public School system uses the MCAS, or the Massachusetts Comprehensive Assessment System. The table below shows an overall increase in the percent of students scoring proficient or higher in Massachusetts:

## Statewide Grade 10 MCAS Results, 1998-2015

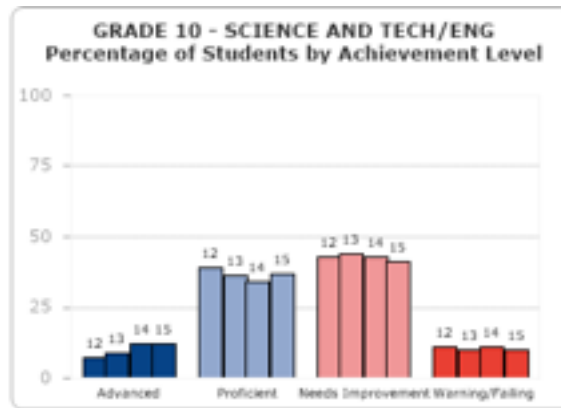


Between the three categories, English Language Arts, Mathematics, and Science and Technology, the average percentage of students scoring proficient in Massachusetts is roughly 81% as of 2015. In order to compare this specifically to Worcester Public Schools, I've compiled the information for their grade 10 as well, as seen below:

## Worcester Public Schools MCAS Results as of 2015







You don't need to be a math teacher to calculate that the average percentage of students scoring proficient is only about 40% across all three categories. I relate this significant gap back to the different social, economic, and cultural backgrounds I've encountered through my short experience. Educators and students must work together to raise the overall student achievement and standards of the Worcester Public School system.

# Chapter Two

## Curriculum Framework

To reiterate, on a daily basis I taught a total of four classes, two algebra 2 classes, and two honors geometry classes. This gave me a wide range of students to work with, ranging from 9th graders to 12th graders, and from age 13 to 19. Teaching among such a wide range of students and academic needs, there are 9 items of my curriculum and instruction I kept in mind.

*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.*

With each lesson plan I developed I followed a logical and sequential order of events. The information was cumulative, but did not need to necessarily follow the layout of the textbook. For instance, if I were to be teaching about polygons in honors geometry, it would not be unorthodox for me to skip ahead several chapters for next weeks lesson to cover solving for the area of polygons next. This gave the students the ability to learn about about a topic and then apply the information they have acquired to further their knowledge.

*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.*

Each of my classes were structured in such a way to include formal assessments from homework, worksheets, quizzes, and tests. See appendix for for examples. These assessments are important to see the students' grasp of the material as well as for self-evaluation of my teaching of the material. Homework was a good measurement of what was taught in class that day. In class examples were mean't to adequately aid students' while working at home, and occasionally harder questions would be assigned to gage their critical thinking and analytical skills.

Informal assessments include student improvement and work ethic in my classroom. By this I simply mean that not all students use class time wisely, and I tried to take notice to those who didn't use time wisely, and those that did. If I noticed a student was studious in class but still didn't have a good comprehension of the material, I'd take that into consideration when viewing how I teach the material.

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

Because my classes were math based, there was not a lot of required reading. When beginning a new topic I was sure to introduce any new vocabulary words, and express them in three ways; verbally, verbatim from the book, and mathematically. My lesson plans followed the book in such a way that it would be easy for students to look back on in-class examples and cross reference them with their notes for further understanding.

In my honors geometry class I did a project relating to transformations. This gave students the ability to teach and work with one another on the topics we had covered in class.

The project required students to draw out several types of transformations such as translations, rotations, and reflections, using a wide variety of shapes. This project allowed students to get hands-on involvement in my class, and catered to students who may be more visual learners. The grading was done not just with the correctness of the transformation, but also time management, neatness, and teamwork.

*Identifies prerequisite skills, concepts, and vocabulary needed for the learning activities and design lessons that strengthen student reading and writing skills.*

My honors geometry students liked to work at a quick pace for the most part, on the other hand, my algebra 2 students went at a slower pace because I incorporated a lot of repetition into each lesson plan. However, my mentor teacher reminded me that too much repetition isn't a good thing as it could cause students to lose interest or take lesser notes.

My algebra 2 classes started with algebra 1 material, something my students and I both revisited together since it had been so long for myself as well. I used the original foundation of what they had learned to begin the teaching of new concepts and topics in a way that would make the most sense. Eventually, due to poor involvement in class, I began casually checking notebooks to make sure the information my students' needed was making it into their study guides. I'd put vocabulary, definitions, and new equations on the board and highlight what I thought was most important. If it were highlighted by myself, it had better be in their notebooks, too! When new topics were started, I'd give a "do now" with past information my students' had learned, this made it easier to introduce and cover new learning objectives.

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

Planning lesson plans were definitely difficult at first, it was tough to get a hang of how quickly I should move through material, as well as how quickly I could move through material. Time management came with practice, over and over again, day after day.

When beginning a lesson plan at the start of each class I would give a quick summary of what the objective of the day was. For instance, in algebra 2 I might have said something along the lines of “after this class you will all know a four-step method to solving and graphing parabolic equations in vertex form.” Then I’d remind them what we’d already learned, what was a parabola? How have we solved them in the past?

Students’ would be evaluated on the material by their daily homework assignments, in class worksheets, and a quiz or test every Friday. I’ve attached examples of this work in the appendix. After grading assignments I’d be able to see where the students’ excelled, and where more work was needed. If a topic was not fully grasped I’d make my best effort to resist the information, but this was challenging to do on such a tight academic schedule. The following week, after everything had been graded, I’d hand back the tests or quizzes and project one on the board. Then I’d strategically pick the questions the majority of students’ missed and give detailed explanations on how to solve them properly.

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

During my teaching practicum I was extraordinarily fortunate to have a strong network of individuals I could rely on to ask questions when needed.

My mentor teacher always gave my feedback after each lesson on a number of things. Usually there would always be a reminder to be mindful of time, keeping in mind each class period was only 42 minutes. My mentor teacher was an expert, she taught me how to get everything done from attendance and homework review, to new material and classwork, and more. She'd also give me helpful advice for teaching particular lessons, ways she'd done it in the past that worked, recommended problems, and more.

My IQP seminar was also a great way to enhance the overall quality of my teaching and learning. Discussing with other student teachers gave me good insight and perspective on how to go about certain lessons and solving in-class problems. Often I'd ask them how they found ways to deal with a "code-red class." By this we mean't a class that was usually very loud and often tough to reach. My fellow student teachers were able to provide great advice they had tried in class such as keeping proximity to certain students, rearranging seats, and speaking with students on a one-on-one level. After all, in the end we're all just students.

Lastly, I was also fortunate enough to know that I could reach out to and meet up with my advisor at any time. Having this strong support network gave me more confidence in the classroom and helped me deliver my classroom instructions to my students in the most effective way possible.

*Incorporates appropriate technology and media in lesson planning.*

In my classroom the most technology I used for my students' learn was a projector. I'd put the information up, underline what I thought were the most critical parts of it, then explain it in my own words. While my students were writing the information in their notebooks I'd often begin writing more information on the board, making the most use of my time. The projector helped me move through topics at an efficient and timely manner.

One thing I wish I had incorporated in my lessons were the use of videos. For instance, Kahn Academy provides many great visuals with regards to graphing that would have been perfect to show my algebra 2 classes. I'd also found great visuals for geometry that I myself would sometimes view before lessons, this would I could discover the most effect way to teach my students.

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

It was often difficult to create and teach lessons that catered to the needs of all my students. For each student who said I was moving too fast, there was always another student to say I wasn't covering the material fast enough. I found the most effective way to teach was to design my lesson plans in such a way that I repeated the more difficult material, and gave in class problems for students to work on. In class problems were excellent because it gave me the opportunity to walk around the room and answer questions one-on-one with my students.

Also, while teaching I'd look for non-verbal cues from my students. Sometimes these cues were as simple as a puzzled look on their face, other times I'd walk around the room and ask students to tell me where they were at with a simple thumbs up or down. Making period eye contact gives a teacher a lot of insight on how receptive the students are being to the material.

One of my favorite things to say during class after a difficult topic was "put your hands high in the sky if you're still following me, or down low if you're lost in the sauce." It was a simple way for me to gauge whether or not I was good to move on to the next learning objective.

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

I incorporated a wide variety of strategies to meet the diverse needs of my students. These strategies could be as simple as utilizing the projector regularly, and walking around the room answering questions, to providing detailed notebook examples and explanations. There are many ways to explain information in math, through equations, vocabulary, vocally, and many more. In my classes I tried to provide real life examples to keep my students actively engaged while understanding where the new topics they were learning were applicable.

Using these various methods made it possible to reach my students despite having a mixture of languages, cultures, and backgrounds.



# Chapter Three

## Course Materials

During my classes I used a wide range of course materials that I found relevant to keep students engaged inside and outside of the classroom. The structure of my lesson plans, goals of my homework assignments, and all my in class worksheets and evaluations built off one another to help my students achieve the underlying objectives of each topic.

I personally chose to write all my lesson plans by hand, which came with its own advantages and disadvantages. They were easy to make adjustments too and adjust for time, and it was more simplistic to write equations instead of typing them, however, they're not entirely neat if you're not looking at them through my eyes. The top of each lesson plan started with the name of the chapter, for instance in honors geometry I had "Prove Triangles Congruent by ASA and AAS (P. 248)." I'd have this neatly written on the board for my students to see so that way they'd know what to expect from today's lesson, see appendix for examples of lesson plans. Next, I'd have a do now, either written on the white board or projected. The objective of the do now was to reflect on prior information that would continue to be useful for the following lesson. The do now for the lesson stated had my students using the triangle sum theorem they had used the week before, as it could again be used this week to help them solve their proofs. After the do now, I'd say the new topic out loud and also tell my class what I expected from them. In this case I might've said "by the end of this class you should be able to complete two-column proofs to

prove triangle congruency.” If it were Tuesday-Thursday, I’d also a lot time to review the homework from the night before. When my students would be engaged with the do now I’d walk around the room to check homework and figure out where most of my students had difficulties. Then, during my homework review I’d usually go through each problem, but spend far more time on the problems the majority of the class had missed.

At the end of each lesson there would of course be a homework assignment due the next day. This homework assignment had two underlying goals; one, was to see the students comprehension of the new topic, and two, it was for me to evaluate myself and see if I’d done a good job relaying the information in class. For example, when I taught proofs in my honors geometry class, I also encountered the most amount of students willing to stay after school to work with me. This sent a signal to me that my in class instruction might not be particularly clear and hard to follow. Fortunately, as stated earlier, I had a great support network and my mentor teacher gave me a lot of helpful hints for teaching proofs. She also helped field questions and sort out some of the confusion.

Homework assignments were not graded strictly, more often then not I was looking for an honest attempt to get the correct answer. My honors geometry classes would sometimes get “challenge problems,” which were mean’t to make them do some thinking at home. Because they were honors students I expected them to put in some extra effort, the students that came in with no attempt at the challenge problems lost the most points on homework. Unlike my algebra two students, my honors geometry students would sometimes be expected to do a fair amount of

writing in class and at home. All four of my classes were expected to engage in regular classroom discussion and take note, but when it came right down to it my honors geometry students had their hands full with proofs. I'd have them write everything for their two column proofs, because I'm a firm believer that practice makes perfect. This mean't that a basic homework assignment of 3-4 problems could sometimes take up nearly two pages. After all, for a good score they know I'd want to see proper headings and annotations, the given information, a picture of the polygon (usually triangles), and the statements and reasons they came up with. My objective being that if I were to ask, for example, "how did you solve this problem using Angle-Side-Angle?," I wouldn't want them to say "oh, because I think these angles are 72 degrees." Rather the answer I'd be looking for is "well because angle A is 36 degrees, and angles B and C are the base angles of an isosceles, I know they are congruent and each equal 72 degrees."

Algebra two homework was more hit or miss than that. One of the biggest struggles I had was only about 50% of my algebra two students did the homework on a regular basis. I tried several methods to try to keep them focused outside of the classroom; I'd cover information more slowly, give more practice problems and solutions, assign fewer homework problems, but even when feeling confident I'd given my students the tools to achieve I did not see an increase in turned in homework assignments. This was difficult for me to accept and I still wonder what I can do differently. I'm eager to see if my mentor teacher has made any progress in this area, and if so she can enlighten me to her methods.

For in class course materials I'd often create worksheets for my classes. Usually, I'd have a worksheet every two weeks, or where time allotted it. It was a great way to have students work together in class, and give me time to field questions as I walked around the room. Worksheets were worth a large portion of the students grade, roughly 20%. This is because it's possible for all my students to do well on the worksheets by using class time wisely and asking for help when needed. They're not mean't to stress my classes out, rather they're given so myself and my students can evaluate how they're doing with the material they should know by now. If a student were struggling in a particular area the first thing I'd do is ask them to open their notebook to that topic and show me their notes. If a student had the notes, I'd use them to walk them through the problem they were looking at. If a student did not have the notes, I would try to use the instance as a wakeup call that they need to be more attentive in class. In order for me to fully help my students they must help themselves. When a student doesn't take notes it causes me to have to reexplain all the material to them again, which in a perfect world would be okay, but when 24 other students are also looking for help it can be tough to manage the time fairly. At the end of each week would come the test or quiz that these homework assignments, worksheets, and notes should have prepared my students for.

My algebra two quizzes were straight forward, if the students had completed their homework assignments and taken good notes in class hypothetically they should get good grade. I find it important to mention that my mentor teacher had an open notes policy for my algebra two class because they were college level. This being said, it's understandable that students can get lost in the the numbers or letters and blank out during these evaluations, as an engineering

student I can testify that it happens to me more often than not. When questions would arise while taking these quizzes I'd do my best to give a hint or direct them to the proper section in their notebooks to help them with the problem at hand. However, I'd only give so much help because it was up to my students to properly prepare, and it was up to myself to teach the material in such a way they understood it. After the quizzes, I'd grade them and log the files online, see the appendix for details. I'd then try to identify a trend, did my students do well overall? Were they're specific questions most students missed? I'd study the results and use them to prepare and teach my students better for their next evaluation.

In honors geometry, my students were not aloud to use their notes during quizzes and tests. I believe this to be the best way because it causes them to study at home and not rely on their notebooks. Roughly 90% of my honors geometry students handed in their homework each day, knowing that understanding these concepts at home would be a huge asset to them during quizzes and tests.

Looking at everything as a whole, the homework assignments and worksheets completed during the week were to help students develop the skills necessary to achieve a good score on their quizzes and tests. These evaluations then gave me a chance at the end of each week to assess student learning and the methods I used as a student teacher. They were also used as an opportunity for my students to illustrate an understanding of the material taught, allowing us to collectively move to a new topic and further our learning as a class.

# Chapter Four

## Period 2 Algebra II

Looking back at the four classes I taught I'm split between which one I favored most. On one hand, my honors geometry students were always eager to learn and moderately excited to come to class, but on the other hand I truly enjoy the topics of algebra II.

My two honors geometry classes were nearly reflections of one another, both sets of students came ready to work and ready to learn. The primary difference between both classes may have been that my period five class was a bit more boisterous, perhaps because their class fell just before lunch. However, we still kept on topic and got the work done. An unfortunate part of the Doherty Memorial schedule is that during period five, if you have B lunch (like my students), it interrupts the middle of your class. The cons to this are obvious; the students lose focus, they come back talkative and energetic, and in the last 2-3 minutes before the lunch bell rings they're not completely attentive. The advantage was that the class ran an extra five minutes longer. This extra time was crucial to getting the students to re-settle in and continue on with the plan of the day.

Aside from my two honors geometry classes I also taught two algebra II classes. Both of these classes were college level, and a lot of students in these classes were seniors who needed to pass the class to graduate. My period two class was moderately well behaved and we were

usually able to work through new material at a good pace each day. My hypothesis behind this is that because it was a morning class my students didn't have the energy to rebel against the new topics I wanted to cover. My period 4 algebra II class was a different story.

I want to go in depth on this class in particular for a few reasons; one, this was one of my hardest classes to control as a student teacher. I remember towards the beginning of my practicum my mentor teacher told me that I was being “eaten alive.” Two, I had at least a couple of students that I worked hard to reach, but was not able to succeed. This might have been the hardest part of my entire practicum. Three, I had to learn to work with English Language Learner students and convey mathematical information using many various methods. Four, absences were not uncommon, so I had to learn the best way to keep my students in the loop. Because mathematics is very sequential missing one day can easily throw students’ off course and deter them from trying to catch back up. Five, as stated before a lot of these students were seniors. Receiving a failing grade in algebra II as a senior means you don’t get to walk at graduation, making it very difficult for myself as a teacher to give out these grades. Is it my fault as a teacher that they’re failing? Perhaps a loss of motivation? Regardless, I did my best to give these students’ the attention they needed and deserved. Lastly, class periods were short and there was a lot of information to teach, but at the same time I had a lot of behavioral issues in this class that were affecting my teaching and other students’ learning. I had to quickly and efficiently delegate my time to work with all the different groups within this one class.

When I say this was a hard class to control, I can essentially break the classroom apart into sections. As I'm in the front of this class facing my students I'm constantly looking at three separate groups. The first couple of students, let's call them Tim and Tom, would often be off to the side by the windows having their own side conversations while I taught. The only way to prevent this was to physically separate them each and everyday, of course giving me attitude while I did so. Tim would usually take notes whether he was talking or not, but if he was talking to Tom then there was a 99.9% percent certainty Tom would not be taking notes or doing that days' assignment. But we'll talk more about Tom later. The next place my eyes would wander would be to Ashley. Ashley, who sat in the back of the room, had missed several days, if not weeks of school do to personal issues, though she did put forth an honest effort in my class. It would be noticeable by her facial expressions when the work would start to get too stressful for her. I'd try to keep her in mind while I taught and be mindful she might not be having a good day. After teaching and giving my students' in-class independent work to do I'd often like to swing by her desk and remind her that she's doing a great job. On the opposite side of the room from Tim and Tom were two more students, Jessica and Alex. These students' sat a couple seats a way from one another but their mentality was often the same. They'd come in, look at the topic, and sometimes verbally just say "no." And after that it would be near impossible to reach them with any information that class. I devoted as much time as I could to each of them, reexplaining the lessons one-on-one, however, I'd usually receive responses such as "leave me alone." A lot of the times Alex wouldn't have paper, so I'd go and get it for him, only to find it left behind on the desk at the end of class, blank. This perplexed me a lot, and I'll get back to him later. Jessica



appeared to have the most problems with authority. She didn't like me over her shoulder trying to help and she'd say almost anything to get me to go away. A lot of the times I felt she truly thought I was out to get her. For instance, if she was absent and I was checking homework I'd go by her desk and she'd instantly snap "no, I don't have the homework!", when all I really wanted to ask was how she was feeling. These two groups of students on each side of my class made it very difficult to control on a daily basis.

One of the students I mentioned earlier, Tom, I had a very difficult time trying to get through to. He'd come to class each day with the mentality that he'd already failed and was not going to graduate. This wasn't a fact set in stone, but it was something he had already accepted. How do you motivate a student who won't motivate himself? He'd often do no work each day, turning in assignments with only his name on them more often than not. After each academic day he'd meet with a tutor, who would try to help him through the work he was reluctant to do in my class, but even this appeared to just be an attempt to get him the minimum passing grade, passing grade which he still wasn't achieving. I'd try to talk to him one on one, ask what would help and what both of us could do differently. I wanted to remind him that it really wasn't too late to do well in my class and that he had the potential to, and I really did believe that. But by the time my practicum ended I hadn't been able to make an impact on Tom, I wish I could have done something more helpful.

Jessica was another student I was not able to reach as an educator. She did work, but only when she understood it. Once the concepts got too complex she'd shut down, and it would be

very hard to get her going again. I can understand where she's coming from, in mathematics learning a topic taught to twenty five students at once can make it difficult to grasp. Sometimes the material goes too fast, sometimes there's too much to grasp, and sometimes it's tough to ask questions. When I'd notice Jessica had lost her train of thought, I'd work my way over to her desk, when time permitted, to attempt to cover the topics individually with her that she might have missed. However, whenever I'd try to help she'd find some way to push me away, either by saying that she did understand it, or that she didn't and she never would so I should stop. I felt like maybe she was embarrassed to work with me one-on-one in front of the other students. Unfortunately staying after school wasn't an option for her either because she worked. Jessica was a very smart student of mine, I wish I could've found a way to help her through my class better.

In my algebra II class I also had to learn to work with English Language Learner students. ELL student pose another added challenge to teaching multiple students at once. Putting myself in their shoes, I know I'd have to work much harder in order to keep up with the lesson being taught. I want to focus on two students in particular, I'll refer to them as Erin and Chris. I have an enormous amount of respect for all my students, but these two really stood out. For one, they did not start the class at the beginning of the year with the rest of my students, rather they were transferred in later at various times. Starting later in mathematics is often a big disadvantage on its own. The material learned the week prior is applicable to next week's lesson, and so on and so fourth. Making sure they were on par with the rest of the class was the first step. While teaching I also tried to physically direct my voice in their directions, making occasional

eye contact to gage their current understanding. While in front of the room I'd use basic hand gestures to see how everyone was doing, for example I'd have students hold their thumbs up, down, or in the middle. This method worked well for me because I understood my students. I knew who normally performs well and subsequently who might be struggling. If a student of mine who normally does quite well in my class had their thumb down or in the middle then it was a strong indicator for me that I most likely need to revisit my lesson plan and interpret the information differently. In regards to my ELL students, I'd give several opportunities for them to properly acquire the information I was teaching. I'd say my objectives out loud, project the vocabulary from the book, write out and explain the new equations we'd be using, and then clearly annotate step by step examples on the board for my students to copy into their notebooks. One of the trends I noticed that was a bit peculiar to myself was that my ELL students were also some of the highest performing students in my class. Referring back to this algebra II class, for example, my ELL students' averaged about an 85%. My theory is that because they had to work harder to follow my in class instruction, they also had to put fourth the effort at home and study more, giving them more opportunities to wrap their brains around the information.

Moving on to my fourth point, absences were not uncommon in either of my college level algebra II classes. For instance, each day for my period 2 class I'd never have a full class. Each day they'd normally be a different student out due to various reasons. Some days I'd see a student in the hallway, but not in my class. With any luck the student would only be out one day, this would give me the opportunity to reexplain the prior day's lesson by going over the do now with them. This could sometimes be tricky because time was never on my side, however, it

wouldn't be fair to expect an absent student to be able to follow the next lesson when the material is sequential. Typically I could give a couple helpful tips and relate them back to previous problems we'd done in class. The real difficulties would arise when a student would miss multiple days. This means a couple of things; most likely no homework to turn in and not prepared for the weekly quiz. Not being prepared for the quiz usually would result in an extension. Usually the quizzes are Friday, so a reasonable agreement would be to give them until Monday so they have the weekend to study. However, there would still be a problem with finding the time to teach them the lesson. You can give a student the topic and page numbers, but from my experience if it doesn't get done in the classroom then it's highly unlikely to be done at home. Trying to arrange after school help sessions would typically be the best way around this, and for students who can't stay after I'd make myself available during my study and lunch too if necessary.

Often a lot of the students that would be absent would be seniors. Taking into account that students do get sick and need to occasionally miss school, there are also seniors who would not show up to my class for other reasons. The most common reasons I can think of are as follows: they don't like learning math, which is not uncommon, they do not like me as an educator, which is also understandable, or they have a low level of motivation because they are seniors and they want to graduate. This last point is a bit ironic because in order to graduate seniors must pass algebra II.

Knowing this information I subconsciously separated my seniors into three categories: the first being that they do not show a consistent effort in my class. For my students I had that were seniors that came to class with the intent to talk and not pay attention, I'd do everything in my power to make sure they'd learn the material they needed to know. However, if they're assignments and quizzes reflected bad grades it would be up to me as their teacher to inform them of what they need to do to improve, and them as the student to make the changes. One of my students, Jack, sat in the back-middle of my classroom. Despite turning out okay quiz grades, he consistently did not do his homework, causing him to have a low, non-passing grade in my class. During a parent-teacher night at the high school I was able to meet with his father. Of course he asked me how his son was doing in my class, and instead of telling him I showed him on the computer. I pulled up Jack's grades and missing work and his father took note of it. Needless to say Jack came in with a stack of late assignments, which despite only being worth half credit due to being late, still significantly helped his grade. This push by his father really put him on the right track and he began to regularly show a noticeably better effort in my class. This is important because it shows us the importance of learning at school as well as at home.

The next group of seniors I looked at in my class were the ones who knew they needed to do well in my class, buckled down, showed up, asked questions, and did what needed to be done to succeed. For instance, a girl sitting in the middle of my class, Heather, would always do the homework the night it was assigned. Typically she would have very common mistakes on her homework, but because she did it she was able to follow my explanations to the entire class on the board and see where her errors were. If anything were still unclear she wouldn't hesitate to

ask questions. By the time similar material rolled around on her quizzes she'd do very well, not because she grasped it right from the start and aced every assignment along the way, but because she did the work and followed the in-class examples and explanations.

The third group of seniors were my seniors who tried hard in class but still did not have the best grades to show for it. This is a difficult group of students to work with because you know they're working hard and need this class to graduate, but at the same time I would never pass a student for that reason because this information is important to know. Working with these students took a lot of proper timing. Let me elaborate. I'd look at the homework I had assigned to the class and solve it myself the night before. This gave me the opportunity to see how long it took and find where it was plausible the most issues would arise. Then when going over the homework at the start of each class I'd immediately address that second group of seniors, the ones who had done the work and just needed clarification, without taking time from my actual lesson plan. Now that I've made going through homework, and in-class examples alike, an expedient process, I'd be able to devote that much one-on-one time to my third group of seniors. This isn't to say that they were always my full focus of attention, that would be unfair. More along the lines it means if students were doing independent work and there were no questions, while walking around the room I would take the time to stop at these students' desks in particular, knowing that they might not have a complete comprehension of the material but are also slightly too timid to ask questions.

This entire concept of time management is not just influenced by students asking questions and making sure there's enough time to reach everyone, it is also widely influenced by people being "disruptive" in my class. Disruptive is a broad term, when I use it I mean it to include anything that takes my focus off teaching and my students focus off learning. For my period 2 algebra II class specifically, it would be important to make sure I included time in my lesson plans to keep my class on track and deal with students not aiding to the overall constructive atmosphere of the room. Doing this is tricky, if you're too harsh on the students then they can be quick to rebel, but on the other hand if you're too lenient then they won't listen. The trick is what I would call "swift justice." If you tell a student to stop talking more than once, move their seat. If they complain that they weren't the only one talking then move someone else seat too. If a particular student is constantly on their phone, take their phone. I will admit, I never had to take a students phone, but I came close on multiple occasions. The best way to deal with these students is to continue teaching, don't make them the subject of the lesson, parabolas or factoring are the subject. Keep talking and teaching as you politely step away from the board, move into close proximity, and make eye contact with the student at fault. This allows the lesson to progress at a steady pace while letting your students know that you're alert and attentive to the in-class disruptions.

All of this is easier said then done, and took my several weeks to get into a good pace. The real question that may still be dangling is "okay, what if you do all of that and you still have issues with your class?" Well I've had instance like that as well. In this same class I had three students who always say together, let's call them Tom, Richard, and Harry. It was not out of the

ordinary for them to be talkative and for me to have to move seats, but one day they just weren't having it. If I moved Tom's seat, it just meant Richard and Harry would talk across the class to communicate with him. If I made eye contact and moved into proximity then they'd smile, acknowledging that they saw me but didn't care. When it came time for my students to do independent work, I politely asked all three of those students to step out into the hall with me. In the hall I didn't get upset, or angry, or repeat what I'd said in class, but instead I was honest with them. I reminded them that all four of us were students and that I'm doing the best I can to educate a class of individuals, and when they're all talking in my class it makes it hard for me to teach and for them to learn. They got the message and things balanced out for a while. This isn't to say that they stopped talking all together in my class, but I do believe they had a new amount of respect and appreciation for me as their student teacher.

This algebra II class really did give me a run for my money some days, but each and everyone of my students showed a lot of potential. I hope that when I resist Doherty Memorial High School that I see progress in my students who needed it, and a continued high level of learning for the class as a whole.



# Chapter Five

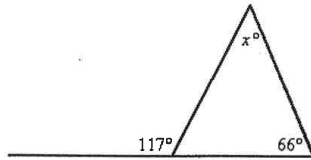
## Assessment

Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

ID: A

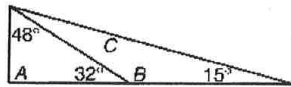
### Congruency Test

1. A triangle has angle measures of  $60^\circ$ ,  $60^\circ$ , and  $60^\circ$ . Choose the term that describes the triangle.  
a. Equiangular    b. Right    c. Obtuse    d. Scalene
2. How many obtuse angles can an isosceles triangle have?  
a. 2    b. 3    c. 0    d. 1
3. Find the value of  $x$ .



- a. 117    b. 297    c. 66    d. 51

4. Refer to the figure below.  $m\angle C =$  \_\_\_\_\_.

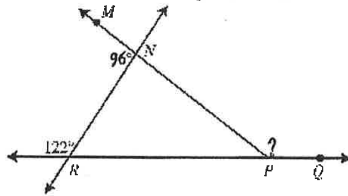


- a.  $100^\circ$     b.  $17^\circ$     c.  $148^\circ$     d.  $15^\circ$

5. Which pair of lengths can be two of the sides of an isosceles triangle which has a perimeter of 52 inches?  
a. 15 inches, 25 inches    c. 12 inches, 22 inches  
b. 15 inches, 22 inches    d. 16 inches, 21 inches

6. **GRIDDED RESPONSE** Grid the correct answer on a separate gridding sheet.

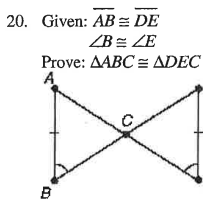
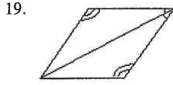
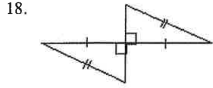
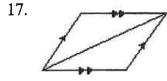
What is the measure, in degrees, of  $\angle QPN$ ?



Name: \_\_\_\_\_

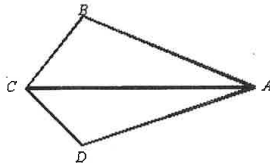
ID: A

Tell which method(s) you can use to prove that the triangles are congruent. If no method can be used, write none.



Statements	Reasons
1. _____	1. Given
2. $\angle BCA \cong \angle ECD$	2. _____
3. $\triangle ABC \cong \triangle DEC$	3. _____

21. Given:  $\angle BAC \cong \angle DAC$ ,  $\angle B \cong \angle D$   
 Prove:  $\triangle ABC \cong \triangle ADC$



Statements	Reasons

The two images above are two of four pages of a triangle congruency test given to my Honors Geometry students. The test gives the student the opportunity to use multiple choice, problem solving, and empty a logical thought process when filling out the proof table.

Find the slope of the line through each pair of points.

1)  $(2, 19), (11, -8)$

2)  $(-2, -1), (2, -1)$

Write the slope-intercept form of the equation of the line described.

3) through:  $(2, -4)$ , parallel to  $y = -\frac{1}{2}x + 1$ .

4) through:  $(2, 4)$ , parallel to  $y = -\frac{5}{3}x$

5) through:  $(3, -1)$ , perp. to  $y = 3x + 2$

6) through:  $(-1, -1)$ , perp. to  $y = -\frac{1}{3}x + 2$

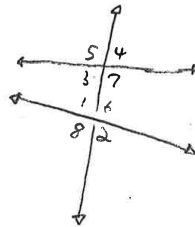
Identify the angle-pair relationship

$\angle 1$  and  $\angle 5$  \_\_\_\_\_

$\angle 5$  and  $\angle 2$  \_\_\_\_\_

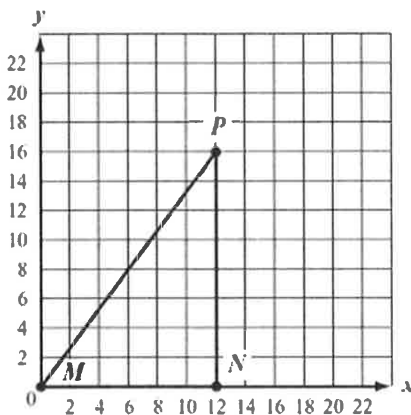
$\angle 3$  and  $\angle 6$  \_\_\_\_\_

$\angle 3$  and  $\angle 1$  \_\_\_\_\_



This assessment reflects a short quiz given to my Algebra II class. The quiz reviews finding slope from Algebra I and identifying angle-pair relationships. The day prior to giving any quiz we'd have a review day to prepare use and identify what areas may require extra studying.

Triangle  $MNP$  has vertices at  $M(0, 0)$ ,  $N(12, 0)$ , and  $P(12, 16)$ , as shown in the diagram below.



Let point  $R$  be the midpoint of  $\overline{MN}$ . Let point  $S$  be the midpoint of  $\overline{NP}$ .

a. What are the coordinates of each of the points listed below?

- point  $R$
- point  $S$

Show or explain how you got your answer for each point.

b. Is  $\overline{RS}$  parallel to  $\overline{MP}$ ? Show or explain how you got your answer.

c. What is the length, in units, of each of the line segments listed below?

- $\overline{MN}$
- $\overline{NP}$
- $\overline{MP}$

Show or explain how you got your answer for each line segment.

d. The length of  $\overline{MP}$  is how many times the length of  $\overline{RS}$ ? Show or explain how you got your answer.

The next two pages are an example of practice MCAS problems I'd give to my Honors Geometry class. This assessment is on the longer side, so they would have been allotted the entire class period to complete it. Other practice problems may have been shorter and acceptable for a do-now. Overall they'd be a little more difficult than what we'd learned in class, however, they would follow the same concepts we would have been covering. For example, the first problem is about a circle, and it would be expected that students recognize that a circle is 360 degrees as well as vertical angles.

# Chapter Six

## Conclusion

My experience at Doherty Memorial High School tested me in many ways: patience, work ethic, organization, and much more. While teaching at the high school I often found myself feeling overwhelmed as it was increasingly difficult to wake up early each day ready to teach for six hours, then leave and resume my regular college classes. Once I left the high school each day my work was far from over, I'd have to set time aside to create lesson plans and quizzes, grade tests, update my students' scores online, etc. It created a lot of stress, feeling that I wasn't doing enough but was struggling to find the time to do more. In my three and a half months teaching I gained a whole new appreciation for teachers. All this being said, I loved it. I wouldn't trade this experience for anything, I grew quite fond of my students' and didn't realize how hard it would be to leave in the end. In the end, I hope the passion and enthusiasm I tried to put into my teaching came across and inspired my students' to continue to learn and strive to reach their goals. I look forward to visiting them before my school year at WPI and I hope they'll be as excited as I am to see them!

We will miss you  
Mr. Morneau!



BECAUSE  
OF  
YOU  
WE AREN'T  
LOST IN THE  
SAUCE!



Thank 😊  
You For  
Everything!  
You did  
Great!!!

On my last day a few students presented me with a couple of kind notes. It's the little things like these that truly make the entire experience worth it.

# Appendix

42
1.4
43

**DOHERTY MEMORIAL HIGH SCHOOL**  
**BELL SCHEDULE**

A	B	C	D	E	F
<b>1</b> 7:20 – 8:28	<b>1</b> 7:20 – 8:05	<b>1</b> 7:20 – 8:05	<b>1</b> 7:20 – 8:05	<b>1</b> 7:20 – 8:05	<b>1</b> 7:20 – 8:05
<b>2</b> 8:32- 9:14	<b>2</b> 8:09 – 9:14	<b>2</b> 8:09 – 8:51	<b>2</b> 8:09 – 8:51	<b>2</b> 8:09 – 8:51	<b>2</b> 8:09 – 8:51
<b>3</b> 9:18 – 10:00	<b>3</b> 9:18 – 10:00	<b>3</b> 8:55-10:00	<b>3</b> 8:55 – 9:37	<b>3</b> 8:55 – 9:37	<b>3</b> 8:55 – 9:37
<b>4</b> 10:04 – 10:46	<b>4</b> 10:04 – 10:46	<b>4</b> 10:04 – 10:46	<b>4</b> 9:41-10:46	<b>4</b> 9:41 – 10:23	<b>4</b> 9:41 – 10:23
<b>5A</b> 10:51-11:11 1 <sup>st</sup> Lunch 11:16 – 12:09 class	<b>5A</b> 10:51-11:11 1 <sup>st</sup> Lunch 11:16 – 12:09 class	<b>5A</b> 10:51-11:11 1 <sup>st</sup> Lunch 11:16 – 12:09 class	<b>5A</b> 10:51-11:11 1 <sup>st</sup> Lunch 11:16 – 12:09 class	<b>5A</b> 10:28 – 10:48 1 <sup>st</sup> Lunch 10:53- 11:46 class	<b>5A</b> 10:28 – 10:48 1 <sup>st</sup> Lunch 10:53- 11:46 class
<b>5B</b> 10:50 – 11:15 Class 11:20-11:40 2 <sup>nd</sup> Lunch 11:45 – 12:09 class	<b>5B</b> 10:50 – 11:15 Class 11:20 -11:40 2 <sup>nd</sup> Lunch 11:45 – 12:09 class	<b>5B</b> 10:50 – 11:15 Class 11:20 -11:40 2 <sup>nd</sup> Lunch 11:45 – 12:09 class	<b>5B</b> 10:50 – 11:15 Class 11:20-11:40 2 <sup>nd</sup> Lunch 11:45 – 12:09 class	<b>5B</b> 10:27 – 10:52 Class 10:57 – 11:17 2 <sup>nd</sup> Lunch 11:22 – 11:46 class	<b>5B</b> 10:27 – 10:52 Class 10:57 – 11:17 2 <sup>nd</sup> Lunch 11:22 – 11:46 class
<b>5C</b> 10:50 – 11:43 class 11:48-12:09 3 <sup>rd</sup> Lunch	<b>5C</b> 10:50 – 11:43 class 11:48-12:09 3 <sup>rd</sup> Lunch	<b>5C</b> 10:50 – 11:43 class 11:48-12:09 3 <sup>rd</sup> Lunch	<b>5C</b> 10:50 – 11:43 class 11:48-12:09 3 <sup>rd</sup> Lunch	<b>5C</b> 10:27 – 11:20 class 11:25-11:46 3 <sup>rd</sup> Lunch	<b>5C</b> 10:27 – 11:20 class 11:25-11:46 3 <sup>rd</sup> Lunch
<b>6</b> 12:13 – 12:55	<b>6</b> 12:13 – 12:55	<b>6</b> 12:13 – 12:55	<b>6</b> 12:13 – 12:55	<b>6</b> 11:50-12:55	<b>6</b> 11:50 – 12:32
<b>7</b> 12:59 – 1:43	<b>7</b> 12:59 – 1:43	<b>7</b> 12:59 – 1:43	<b>7</b> 12:59 – 1:43	<b>7</b> 12:59 – 1:43	<b>7</b> 12:36 – 1:43

\*Lunch will be assigned based upon the scheduled location of the period 5 class  
\*Lunch periods will rotate three times per year; all students will have first lunch for one third of the school year.  
(approximately 13 weeks).

*Doherty Memorial daily class schedule.*



## Survey: Period 2 4 5 6

1. How well does Mr. Morneau use time effectively and efficiently?

Not Good                      Average                      Very Good  
1                      2                      3                      4                      5

2. I prepared for each test.

Not Good                      Average                      Very Good  
1                      2                      3                      4                      5

3. The test accurately gages how much I learn.

Never                      Sometimes                      Always  
1                      2                      3                      4                      5

4. Does Mr. Morneau treat all the students fairly?

Never                      Sometimes                      Always  
1                      2                      3                      4                      5

5. Do you enjoy having Mr. Morneau as the teacher?

Never                      Sometimes                      Always  
1                      2                      3                      4                      5

6. Does Mr. Morneau clearly explain what is happening in class?

Never                      Sometimes                      Always  
1                      2                      3                      4                      5

7. Mr. Morneau is approachable and willing to help me.

Never                      Sometimes                      Always  
1                      2                      3                      4                      5

Please write any feedback you have on the for Mr. Morneau on how he can do better, what frustrates you about this class, and what you like. Remember, be honest!

*Survey given to my students near my last day of teaching.*

Graph each transformation on a different graph (13 graphs total). Clearly label EVERYTHING (x and y-axis, points, etc). Remember folks, all rotations are counterclockwise.

- 1.) The vertices of Triangle ABC are the following: A (-2, 3), B (-1, 5), and C (3, 3).
  - a.) Translate  $(x, y) \longrightarrow (x + 2, y - 5)$ .
  - b.) Reflect on the line  $y=x$ .
  - c.) Rotate  $90^\circ$
- 2.) The vertices of Quadrilateral DEFG are the following: D (-3, -1), E (-2, -2), F (3, -3), and G (-1, -5).
  - a.) Translate  $(x, y) \longrightarrow (x + 2, y - 5)$ .
  - b.) Reflect on the x-axis.
  - c.) Rotate  $180^\circ$
- 3.) The vertices of Quadrilateral HIJK are the following: H (-4, 2), I (4, 4), J (3, 1), and K (-2, -2).
  - a.) Translate  $(x, y) \longrightarrow (x - 1, y - 3)$ .
  - b.) Reflect on the line  $y=-x$ .
  - c.) Rotate  $270^\circ$
- 4.) The vertices of Quadrilateral LMNO are the following: L (-2, 3), M (1, 5), N (1, -4), and O (-2, -3).
  - a.) Translate  $(x, y) \longrightarrow (x - 3, y - 1)$ .
  - b.) Reflect on the line  $y=-1$ .
  - c.) Rotate  $90^\circ$
- 5.) What is the glide reflection after rotating C (2, 2) and D (4, 2)  $180^\circ$ , and then reflecting it over the line  $y=x$

*A two-day project assigned to my Honors Geometry class allowing them to learn and study various translations.*

4.5 and 4.8

Do now: Solve the equation

$$7r^2 - 10 = 25$$

① simplify  $7r^2 = 35$

$$r^2 = 5$$

②  $\sqrt{r^2} = \pm\sqrt{5}$

$$r = \pm\sqrt{5}$$

HW Review

24.)  $x^2 = 84 : x = \sqrt{84}$

$$\sqrt{84} = \sqrt{4 \cdot 21} = 2\sqrt{21}$$

25.)  $6z^2 = 150 : z^2 = 25 : z = \pm\sqrt{25}$

$$z = \pm 5$$

26.)  $4p^2 = 448 : p^2 = 112 : p = \sqrt{112}$

$$\sqrt{112} = \sqrt{16 \cdot 7} = 4\sqrt{7}$$

$$p = \pm 4\sqrt{7}$$

More complicated example:

$$4(x-1)^2 = 8$$

$$(x-1)^2 = 2$$

$$\sqrt{(x-1)^2} = \pm\sqrt{2}$$

$$x-1 = \pm\sqrt{2}$$

$$x = 1 \pm \sqrt{2}$$

Try:

$$7(x-4)^2 - 18 = 10$$

$$7(x-4)^2 = 28$$

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

$$x-4 = \pm\sqrt{4}$$

$$x-4 = \pm 2$$

$$x = 2, 6 \quad \left. \begin{array}{l} -2+4=2 \\ 2+4=6 \end{array} \right\}$$

Rationalize denominators of Fractions

ex.  $\sqrt{\frac{5}{2}} = \frac{\sqrt{5}}{\sqrt{2}}$  (quotient rule):  $\frac{\sqrt{5}}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{10}}{2}$

product creates a rational number

$$\frac{7\sqrt{5}}{2 \cdot 3} = \frac{7\sqrt{5}}{6}$$

Try:  $\frac{8}{\sqrt{3}} = \frac{8\sqrt{3}}{3}$  and  $\sqrt{\frac{18}{11}} = \frac{\sqrt{18}}{\sqrt{11}} \cdot \frac{\sqrt{11}}{\sqrt{11}} = \frac{\sqrt{198}}{11} = \frac{3\sqrt{22}}{11}$

#### 4.8: Quadratic formula and the Discriminant

For an equation in standard form when  $a \neq 0$  the solutions are:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

ex, solve  $x^2 + 3x = 2$

① write in standard form:  $x^2 + 3x - 2 = 0$

② identify  $a, b, c$ :  $a=1, b=3, c=-2$

③ plug into the quadratic formula:  $x = \frac{-3 \pm \sqrt{3^2 - 4(1)(-2)}}{2(1)}$

④ simplify:  $x = \frac{-3 \pm \sqrt{17}}{2}$  calculator:  $x = 0.56$  and  $x = -3.56$   
x-intercepts

Try:  $x^2 - 4x - 5 = 0$

$a=1, b=-4, c=-5$

$$\frac{4 \pm \sqrt{4^2 - 4(1)(-5)}}{2(1)}$$

$$\frac{4 \pm 6}{2} = 5, -1$$

$x^2 - 6x = -7$

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

$a=1, b=-6, c=7$

$$\frac{6 \pm \sqrt{6^2 - 4(1)(7)}}{2(1)} = \frac{6 \pm \sqrt{8}}{2}$$

Pg. 269 · 7-10

HW: Pg. 296 · 5-9

Example of a daily Algebra II lesson plan.

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## H. Geometry

## Ch. 6.2 Use Proportions to Solve Geometry Problems

Do now: pg 361, # 50 (project) :  $3(60) = 4(10q + 15)$

$$\text{simplify: } \frac{3}{2p+s} = \frac{1}{q} : 27p = 2p + s \quad 60 = 40q + 60$$

$$25p = s \quad 1\frac{1}{2} = q$$

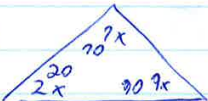
$$\boxed{p = \frac{1}{5}}$$

HW Review: Pg. 360 4, 9, 12, 21-27, ~~32~~

$$4.) \frac{15}{12} = \frac{5 \text{ cm}^2}{4 \text{ cm}^2}$$

$$a.) \frac{316}{100z} = \frac{1180z}{100z} = \frac{240z}{50z}$$

12.) wil <sup>longest side</sup>  
 $16:18 = 8:9$

21.)   $18x = 180$   
 $x = 10$

22.)   $36x = 180$   
 $x = 5$

23.)  $\frac{6}{x} = \frac{3}{2} : 12 = 3x$   
 $x = 4$

24.)  $\frac{7}{20} = \frac{3}{10} : 60 = 10y$   
 $y = 6$

25.)  $\frac{2}{7} = \frac{12}{z} : 84 = 2z$   
 $z = 42$

26.)  $\frac{j+1}{5} = \frac{4}{10} : 20 = 10(j+1)$   
 $20 = 10j + 10$   
 $10 = 10j$   
 $\boxed{j = 1}$

27.)  $\frac{1}{c+s} = \frac{3}{24} : 24 = 3(c+s)$   
 $24 = 3c + 3s$   
 $9 = 3c$   
 $\boxed{3 = c}$

Project p. 359: Geometric mean.

$$x = \sqrt{ab}$$

ex. G-mean of 2 and 18

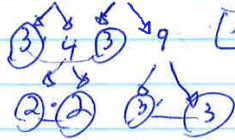
$$x = \sqrt{2 \cdot 18} = \sqrt{36} = 6$$

ex. G-mean of 24 and 48

$$x = \sqrt{24 \cdot 48} = \sqrt{24 \cdot 24 \cdot 2} = 24\sqrt{2}$$

Try: 12 and 27

$$x = \sqrt{12 \cdot 27}$$



$$x = 3 \cdot 2 \cdot 3$$

$$x = 18$$

18 and 54

$$x = \sqrt{18 \cdot 54}$$



$$x = 18\sqrt{3}$$

6.2 Project words on 367

Reciprocal Property

If  $\frac{a}{b} = \frac{c}{d}$  then  $\frac{b}{a} = \frac{d}{c}$  } If ratios are equal then so are reciprocals.

If  $\frac{a}{b} = \frac{c}{d}$  then  $\frac{a}{c} = \frac{b}{d}$  } Interchanging the means forms another true proportion.

If  $\frac{a}{b} = \frac{c}{d}$ , then  $\frac{a+b}{b} = \frac{c+d}{d}$  } adding the value of each ratio's denominator to the numerator forms another true proportion.

Project ex 1.)  $\frac{MN}{RS} = \frac{NP}{ST} ; \frac{8}{10} = \frac{4}{x}$

Reciprocal property:  $\frac{10}{8} = \frac{x}{4}$

"mean" property:  $\frac{8}{4} = \frac{10}{x}$

property of proportions  $\rightarrow$  "Add denominators" property:  $\frac{8+10}{10} = \frac{4+x}{x} ; \frac{18}{10} = \frac{4+x}{x}$

Try ex 2) Given, POP, Sub, Cross mult

HW p. 367, 3-6, 11-12

An example of a daily Honors Geometry lesson plan.

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## Algebra II

Do now:

Solve for y:  $4y + 8x = 20$

$$6y - 3x = 18$$

Graph your solutions

9/29 Do now:

Graph the following functions

$$f(x) = -\frac{4}{5}x + 2$$

$$f(x) = -x$$

9/30 Graph the equations in standard form.

$$5x - y = 3$$

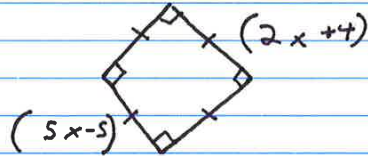
$$3x + 4y = 12$$

*Various do-nows I created to engage students at the beginning of Algebra II.*

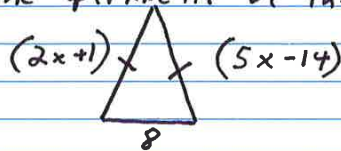
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## Honors Geometry

Do now: Find the perimeter in inches of a regular quadrilateral.

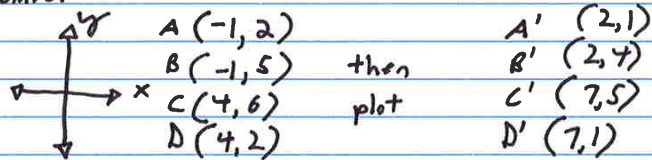


Find the perimeter of this isosceles triangle.



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Draw a graph and plot the following points:



Connect each set of four points to complete two shapes.

Various do-nows I created to engage students at the beginning of Honors Geometry.

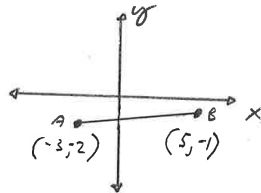


Quiz Retake: Measuring Angles

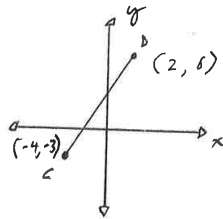
Name \_\_\_\_\_

Date \_\_\_\_\_

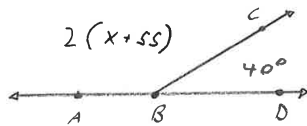
1.) Find the distance of  $\overline{AB}$

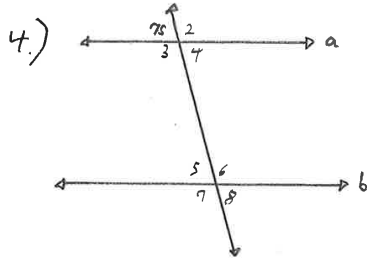


2.) Find the midpoint of  $\overline{CD}$



3.) solve for the  $m\angle ABC$  and  $x$  if  $m\angle ABC$  and  $m\angle CBD$  are supplementary.





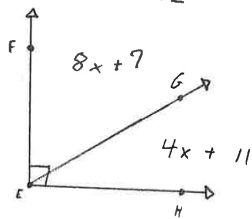
Lines  $a$  and  $b$  are parallel, find

$$m\angle 2 =$$

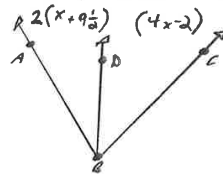
$$m\angle 7 =$$

$$m\angle 8 =$$

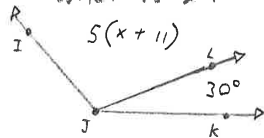
5.)  $\angle FEH$  is a right angle,  
find  $m\angle FEG$  and  $m\angle GEH$



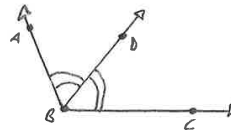
6.)  $\overline{BD}$  is an angle bisector,  
find  $m\angle ABD$  and  $m\angle DBC$



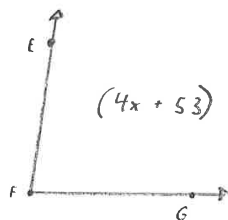
7.) If  $m\angle IJK = 135^\circ$ ,  
what is  $x$ ?



8.) If  $m\angle ABC = 110^\circ$ , find  
 $m\angle ABD$  and  $m\angle DBC$



9.) Solve for  $x$  if  
the  $m\angle EFG = 87^\circ$



Quiz retake I made for my Honors Geometry class, allowing some students to get a better grade if they chose to stay after and study with myself or Ms. Richard first.

