Student Teaching Practicum at Doherty Memorial High School

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Abstract

During the Fall Semester of 2016, I served as a student teacher at Doherty Memorial High School in Worcester, Massachusetts. This teaching practicum counted as my Interdisciplinary Qualifying Project for Worcester Polytechnic Institute (WPI). In this report, I discuss important educational reforms in the state of Massachusetts, and explore relevant background information about Doherty High School. This illustrates a picture of the school environment I was working in. The focus of this paper is to discuss my growth as an educator in the six essential elements of CAP, Candidate Assessment Performance. Meeting proficiency in the standards of well-structured lessons, adjustment to practice, meeting diverse needs, safe learning environment, high expectations, and reflective practice is necessary to becoming a licensed teacher in Massachusetts. I demonstrated proficiency in all six, and I elaborate on the strategies and methods I employed to achieve this. In terms of preparation for this experience, my education at WPI helped prepare me for the content and skills I had to teach my students. Finally, I provide an analysis on each of my classes, focusing on student feedback and strategies I used for individual students. All sources I used are cited in the Works Cited page and additional referenced material is located in the Appendix.

Acknowledgments

I would like to acknowledge all the people who helped contribute to this practicum. My mentor teacher, Ms. Kathryn Richard, gave me excellent support, feedback, and resources during my time as her student teacher. Her mentorship helped shape me to become the teacher I was, and gave me the tools to be prepared every day. Ms. Katherine Elmes and Mrs. Shari Weaver, the program coordinators and seminar instructors, assisted me by handling all the logistics and giving me guidance on how to handle the issues in my classroom. I would also like to thank Mr. Peter Collins, my Calculus teacher in high school, who was inspired me to enter the classroom as an educator. Mr. Collins showed me the significant impact teachers can have on their students. Finally, and most importantly, I would like to thank all the students I taught for having made my teaching experience such an enjoyable, interesting, and exciting experience.

Chapter 1: Background

Massachusetts Education Reform Act of 1993

The main provisions of the Massachusetts Education Reform Act of 1993 created statewide standards for all academic subjects, accountability for students and faculty through mandatory testing and performance checks, and increased government funding in order to achieve these goals. Before the reform was instituted, the only state standards that existed were in the subject areas of history and physical education. The need for standardization in all subjects became apparent, and the Massachusetts Education Reform Act worked to address it. Statewide frameworks were developed for mathematics and ELA (English Language Arts) in 1996, and these standards are continuously updated. After these standards were established, standards were created for the remaining academic subjects. These reforms proved to be successful, and Massachusetts became the leading state in the country in the area of education (1). The Massachusetts Education Reform Act became an important piece of legislation for other states to follow.

The second component to the reform worked to assess the students, teachers, and school districts through mandatory testing. The Massachusetts Comprehensive Assessment System (MCAS) was developed to test the level of student understanding in the subjects of mathematics, ELA, and science. While MCAS testing was originally designed for grades 4, 8, and 10, it has expanded to almost all grades, including incorporation at the high school level. Competency determination, otherwise known as CD, was developed as a mandatory graduation requirement for all public school students. Students must pass the 10th grade MCAS examinations in order to receive a diploma their senior year. Tracking the scores and improvement in the MCAS results shed light on the strengths and weaknesses of the students, teachers, and school districts. These

results have been used to tailor the curriculum to ensure that all students are reaching mastery in critical subject area (1).

Trends in International Mathematics and Science Study (TIMSS)

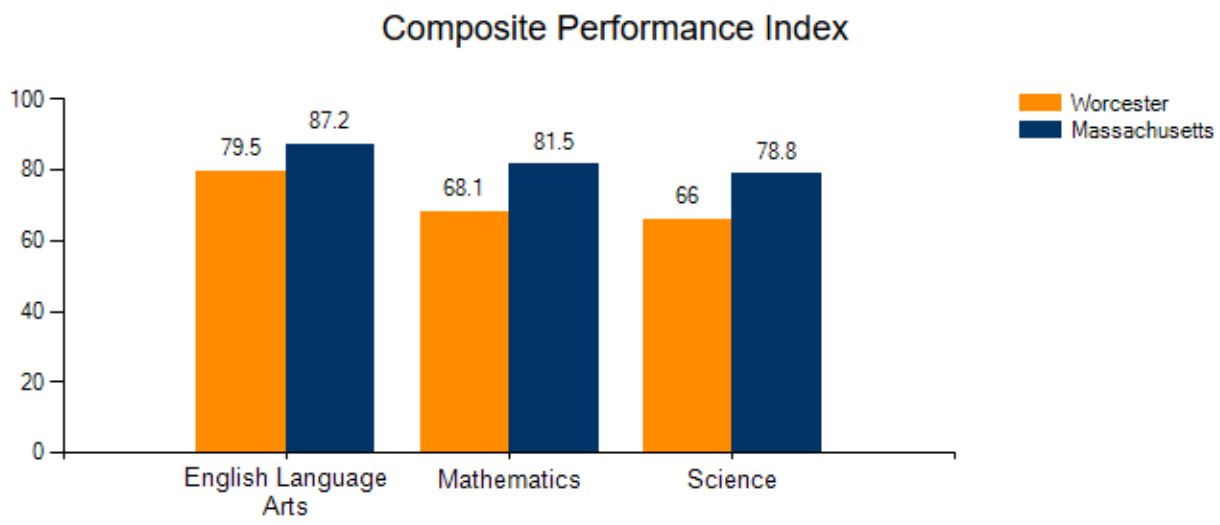
The Trends in International Mathematics and Science Study, otherwise known as TIMSS, is used as indicator of student performance in mathematics and science in comparison to other countries (2). The state of Massachusetts has performed higher than most countries and other states within the U.S. The results from the 2011 average mathematics score of 8th-grade students, as shown in the table below, illustrates that Massachusetts students demonstrate mastery in comparison to many other countries (3). The TIMMSS results serve as testament to the fact that the education system in Massachusetts prepares students well in math and science.

Grade 8	
Education systems higher than Massachusetts	
Korea, Rep. of	*Chinese Taipei-CHN*
Singapore	*Hong Kong-CHN*
Education systems not measurably different from Massachusetts	
Japan	
Education systems lower from Massachusetts	
Minnesota-USA	Norway
Russian Federation	Armenia
North Carolina-USA	*Alabama-USA*
Quebec-CAN	Romania
Indiana-USA	United Arab Emirates
Colorado-USA	Turkey
Connecticut-USA	Lebanon
Israel	*Abu Dhabi-UAE*
Finland	Malaysia
Florida-USA	Georgia
Ontario-CAN	Thailand
United States	Macedonia, Rep. of
England-GBR	Tunisia
Alberta-CAN	Chile
Hungary	Iran, Islamic Rep. of
Australia	Qatar
Slovenia	Bahrain
Lithuania	Jordan
Italy	*Palestinian Nat'l Auth.*
California-USA	Saudi Arabia
New Zealand	Indonesia
Kazakhstan	Syrian Arab Republic
Sweden	Morocco
Ukraine	Oman
Dubai-UAE	Ghana

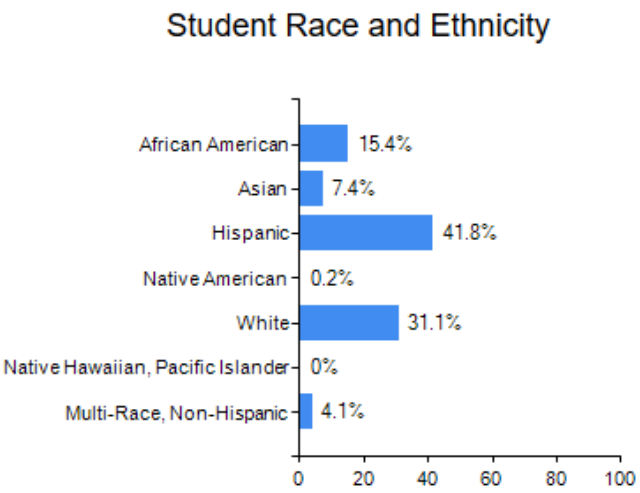
Doherty Memorial High School

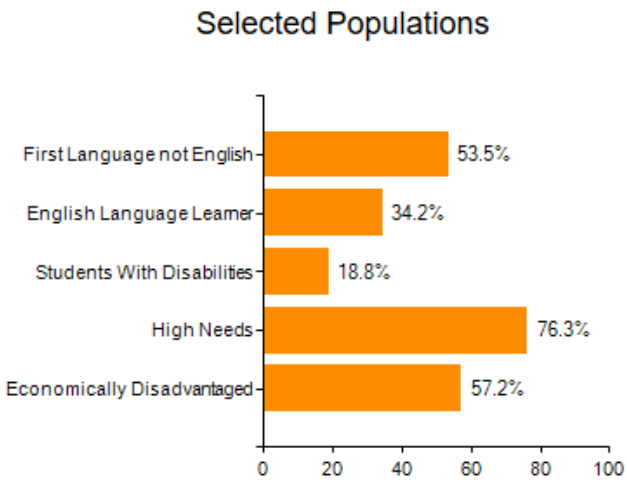
Overview of Worcester Public Schools

The Worcester Public School District has 45 schools and serves 25,479 students in the Worcester community. The district is ranked at Level 4 out of the School District and Accountability Test. Level 1 is the highest, and Level 5 is the lowest. This is used as an indicator for the state to determine which districts need additional assistance and support. The Worcester School District is one of greater need. According to the Composite Performance Index, the district performs slightly lower than the Massachusetts average in the subjects of Math, Science, and English Language Arts.



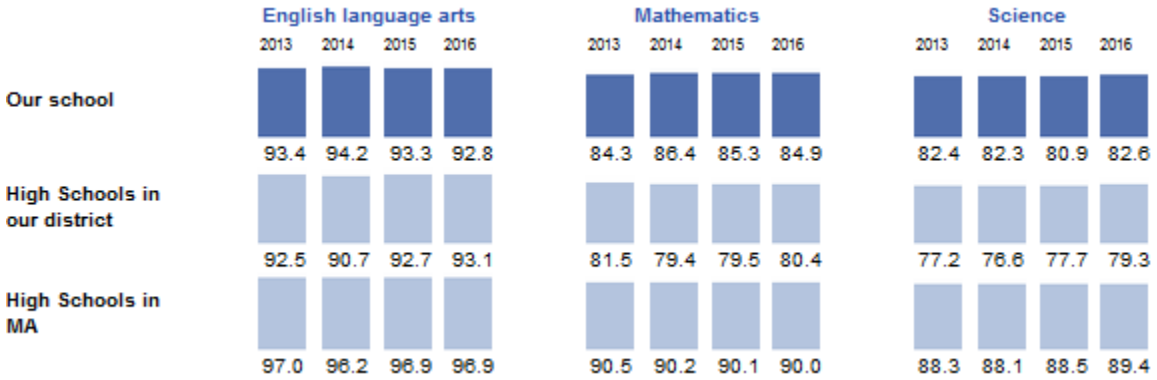
In terms of demographics, the school district is diverse; the significant minority populations are Hispanic, African-American, and Asian. The district has high populations of students who come from economically disadvantaged families and students who are English Language Learners. The data regarding demographics and special populations are listed on the following page (4).





Report Card Overview of Doherty Memorial High School

Doherty Memorial High School is one of the high schools in the Worcester Public School District. It serves 1,543 students in grades 9-12 (5). According to the same accountability test mentioned in the previous section, Doherty High School ranks at Level 3, one level higher than the district. It ranks among the lowest performing 20% of Massachusetts schools. From a percentile system, it ranks at 19th out of 100, where 1 is lowest performing. Looking at MCAS scores, Doherty tends to score higher than the district's average, but lower than the state's average. In order of performance, the MCAS scores are highest in ELA, second highest in Mathematics, and lowest in Science. More detailed data on these scores is shown in the figure below.



While Doherty High School performs lower than the state average in terms of ranking and MCAS scores, it has higher percentages of high needs students, as reflected in the district statistics. Approximately 39.6% of Doherty students are economically disadvantaged, which is 16.7% higher than the state average (6). In order to address this need, Doherty High School has multiple programs to assist these students. The school offers free lunch and breakfast for all students (7). No paperwork or verification is required for a student to receive free lunch, unlike other school districts. Doherty High School also has a significantly greater percentage of ELL students, 21.7%, approximately 3.7 times greater than the state average (6). ELL students require different methods of instruction in order to succeed, which poses unique challenges for educators when teaching classes with a significant number of these students. As the data reflects, Doherty High School faces challenges many other schools do not have, and this results in the school in need of assistance.

Despite these challenges, graduation rates and post-graduation statistics reflect positively on the school. 78.4% of Doherty High School graduates attend institutions of higher education within 16 months of earning a diploma; this is higher than the district average of 65% and the state average of 76.2%. In the Class of 2016, approximately 55% attended a 4-year university and 31% at 2-year colleges. It is evident that Doherty High School effectively prepares students for and encourages the pursuit of higher education. Additionally, the annual dropout rate is comparable to the state average, at about 1.8% (6). Fewer students dropping out of high school results in more students graduating and receiving the knowledge, skills, and education required to enter college, the workforce, or the military.

Mathematics Curriculum Standards

The two classes I taught at Doherty High School were College Algebra II and Honors Geometry. College level classes progress at a slower pace and cover less content than the Honors level classes at Doherty High School. Honors classes involve more independent learning and problem solving, and notes are not allowed during examinations. In Algebra II, the curriculum standards I worked to achieve were expanding student understanding of functions (including graphing), and exponential functions. In Geometry, the curriculum standards were establishing criteria for triangle congruence, for similarity of triangles based on dilations and proportional reasoning, extend work with probability, and prove basic geometric theorems (8).

Chapter 2: Well-Structured Lessons

Lesson planning is crucial for maximizing student learning because it helps steer the pace of the class, account for student understanding, and accommodate students who need additional help or attention. Lesson plans are the tools teachers use to set daily and weekly goals for the classroom. Teachers take these goals into consideration and then map out the unit to maximize student achievement. Having these lesson plans done in advance helps give the educator and the students a clear direction for their learning.

Additionally, lesson planning gives teachers the chance to intentionally plan the accommodations and modifications required for individual students within the classroom. Having a paper copy of these plans during instruction can serve as a helpful reminder of which students will need additional assistance. Lesson planning ensures that the needs of all students are met due to thorough consideration in advance.

Finally, planning at least a week in advance enables the teacher to set the pace of instruction based off student understanding. For example, if the class picks up a concept relatively quickly, the teacher can move seamlessly to the next topic because the next topic's lesson plan would have been already created. Without weekly lesson plans, it becomes more difficult for the educator to tailor the instruction to the rate of student understanding. It is vital for educators to lesson plan in order to accommodate all students, map out the unit, and maintain an efficient classroom.

In my classroom, I used a consistent structure and stringent guidelines to construct my lesson plans. I used the template provided in ID 3100 and IQP Seminar to write them. These lesson plans contained all the components for a thorough, engaging lesson for students. The

format was organized into three stages. The first stage encompassed the curriculum standard, the motivation, content objectives, essential questions, and language objectives. The first stage essentially outlines the goals for each day. The second stage is about assessing student understanding. During this stage, I used methods including exit slips, monitoring the class, and classroom participation to gauge student learning. The third and final stage is the learning plan; it is the implementation of the goals outlined in Stage 1.

Regarding the structure of the class itself, each class would start off with a daily "Do Now", an activity or problem that the students would come in and work on right away. Do Now's are an effective way to start the class because it forces students to start working immediately, while providing the teacher the opportunity to handle classroom logistics. The questions I selected for the Do Now were generally from material taught the day before, in order to review and solidify the concepts in the students' mind. While the students were working, handled the logistics of each day, such as attendance, checking completion of homework assignments, and talking to individual students about missing work. At the beginning of the practicum, students were more interested in talking to their friends than trying to attempt the problem. To incentivize student participation in the Do Now, I would walk around the classroom and grade them on a scale from 0-100. After the students finished the Do Now, I would go over the question with the class, generally with classroom involvement.

The next part of the classroom would be the lesson for the day, generally taught in with a combination of lecture, class participation, group work, and individual problem-solving. If I was going over a new concept, I would make sure to define any necessary mathematical terminology with the class, and then go over basic examples of each example. I would then move on to a more complicated example, and have the class participate in trying to solve for the right answer.

As I progressed as a teacher, I became better at gradually increasing the difficulty of questions to challenge students, without discouraging them with a problem that is difficult beyond their grasp. Maintaining the right balance of concept-building and difficulty is necessary for the progression of student learning. Throughout the lesson, I would give students the chance to attempt questions by themselves or with a partner. Although at the beginning I would only check whether the students were on task, I progressed into giving each student feedback on their work by checking their answers. I would draw a smiley face or check mark on the student's paper if they got the answer correct. This helped engage and motivate the students about their learning. Additionally, I incorporated the student's participation into a daily grade, deducting points for being disruptive with other students, not attempting the problem, or using their phone. This grade would be combined with the grade for the Do Now for a class participation grade. Another area of growth would be gauging whether students should work in partners or individually to solve problems. The philosophy I developed was that if it was an easier question, I would ask that the students work alone, so I could gauge their personal understanding and offer feedback. However, with more challenging problems, I wanted to foster teamwork and idea-sharing by having the students work with a partner or in small groups. In summary, the lesson portion of the class would be a mix of lecture-style learning mixed with classroom participation and time to work on problems individually.

The final part of the class would be a closing activity, either an exit slip or final question. I would design questions in the lesson plan that would summarize what the students had learned. I either collected their work or graded it at their desks, and used their understanding to plan for the next day. It also gave the students the chance to reflect on what they did and did not understand. I showed growth by designing questions that were shorter to fit in the time of the

classroom as the practicum progressed. However, I could still improve by allocating specific time lengths for each portion of the lesson to ensure enough time for the closing. I also would assign homework during this time. At the beginning, I struggled with choosing questions with the appropriate level of difficulty, but I learned that the best homework combines easy, concept-building questions with more challenging questions. To give student's feedback, I allotted time each day to go over the challenging questions on the homework as a class.

In conclusion, I adequately achieved proficient in the standard of well-structured lessons. I demonstrated growth in all aspects of the lesson plan, although I still have a few more areas of improvement. One of my main weaknesses would be the lack of variety of each class. Each day tended to follow about the same template, and while the students liked the regularity of the class, I think it would improve the classroom environment if there was occasionally a different style of learning. I attempted a few during my time as a teacher including Word Problem Day, Jeopardy, and a Triangle Project.

Chapter 3: Adjustment to Practice

In every classroom, it is critical that educators are constantly gauging student understanding, and then adjusting their instruction based on their findings. This strategy is known as Adjustment to Practice, and it is one of the essential elements teachers have to meet proficient in to earn licensure. Adjusting lessons based on understanding is important because it allows the teacher to fit the needs of the students. Without incorporating student feedback, the teacher is likely to either bore the class by moving too slowly through the material, or frustrate their students by speeding through concepts they haven't fully understood yet. In terms of the implementation of adjustment to practice, there are two main steps: evaluation and adjustment. The first step uses a variety of formative assessments to evaluate student performance, and the second step is where the teacher uses those results to actively adjust their instruction to fit the needs of the students.

Regarding the evaluation step, I used multiple methods to assess student understanding. One of the strategies I used was after going over the first example of a new concept, I gave the class a thumbs-up assessment. I asked the students to show a thumbs-up if they felt they understood the concept well, a thumb sideways if they don't fully understand it yet, or a thumbs down if they don't understand at all. Based on their feedback, I would decide the level of difficulty of the subsequent problems. If a majority of the class felt insecure about the topic, I would go over basic, concept-building questions with the class, ensuring to write out each step for maximum clarity. I would then have the class try a few questions on their own, and then review their answers. If the class felt comfortable with the topic, I would have the class try a more challenging question. Their feedback was essential for me to teach the class at the appropriate speed. I used this strategy from the beginning of the practicum, and as time

progressed, my students grew more comfortable with this method and understood the importance of giving me this feedback. I was able to achieve almost full class participation through this method by the end of my time as a student teacher. The thumbs-up method for me was a fast and efficient way for me to gauge the classroom, and adjust my lesson accordingly.

The next method that I employed was checking student work during class time for completion and accuracy. For almost every question the students attempt by themselves, I would walk around the classroom and draw a smiley face on their paper if their answer was correct. If their answer was not correct, I would circle the spot in their work where the student made a mistake and have the student correct it. For the students who were stuck or got the answer incorrect, I would try to follow-up with the student myself or encourage students who got the answer correct to help. The students really enjoyed this method in particular, and it helped motivate them to stay on task. It gave the opportunity for students to receive feedback on their level of understanding, while giving me information on how the class was performing. Based on the number of students that were getting the correct answer, I would decide whether to move on to the next topic, or give the class more practice. If few students were able to complete the problem, I would go over the question with the class, and then provide more practice questions. While initially I would just check to see if the students were working on the problems in class, I progressed into checking their questions in-depth. As time went on, I was able to scan student work quickly and efficiently to be able to check each student's paper. This method in particular was an area where I showed tremendous growth. Checking student work gave me the opportunity to adjust my lesson based on student understanding, while also giving students feedback on their own work and progress.

Another strategy I used to adjust my practice was giving exit slips at the end of class, and then grading them for accuracy. Exit slips are questions given at the end of class to summarize the lesson learned for that day. I would have the students either work on this in their notebooks, or on little pieces of paper they would turn in before they left the classroom. I would grade their exit slips and provide individual feedback on each student's. The students' performance was a good indicator for whether the students understood the material or not. Based on the results, I would adjust the lesson for the next day, allocating more time for review of the previous concept if necessary. While this is an excellent strategy, the questions I originally designed were too long to fit in the class time. One area I would still have to work on allocating class time appropriately to give enough time for this closing.

Finally, the last, and most basic strategy I used to determine the level of student understanding was through class participation. If I asked a question to the class, and only a few students had their hands raised, that would be a good indicator that a lot of the students are unsure of how to approach the problem. If a lot of students were ready to participate and sharing the answers, that was an indicator that the students understood the concept well. Based on student participation, I would adjust the questions I ask. I would ask more challenging questions of the class if the class seemed to understand the material; if they did not, I would start off with more basic questions to boost their confidence and solidify their understanding.

In conclusion, I employed a variety of methods to ensure I was meeting the standard for Adjustment to Practice. I received proficient for this standard, and demonstrated growth as the practicum progressed. The strategy I would really try and improve upon is ensuring enough time at the end of class for exit slips, because I believe that is an important and useful strategy for

Adjustment to Practice. Additionally, I would try to involve the students more in my growth as an educator by asking for their feedback about once a month to see what needs to be improved.

Chapter 4: Meeting Diverse Needs

One of the biggest challenges educators face is being able to meet the needs of all students in a class. Every student is unique, and requires different levels of instruction and attention. Meeting the needs of a diverse classroom seems to be an impossible task, however, there are multiple strategies a teacher can use to achieve this. It involves tiered instruction to address students of varying learning styles and abilities, and the accommodations required for disabilities and ELL learners. It is important for educators to meet this standard because they need to teach 100% of the class, not just a fraction. Every student needs to know they are not forgotten by their teacher, and that requires meeting the needs of each. Although it is difficult to achieve, meeting diverse needs within the classroom is a requirement for teachers and there are many strategies they can use to achieve this goal.

One of the ways I met the needs students with different learning styles was through tiered instruction. All of my classes had a wide range of learning styles, from students that would understand the topic within seconds, to students that needed a lot more guidance and practice in order to master the concept. When I had the class work on individual practice problems, I would add on a few extra, more challenging questions for the students who picked up the concept quicker than the rest of the class to work on. Providing those extra questions gave those students more of a challenge, which kept them from being bored or distracting others, and gave me more time to spend with other students. While I was walking around and checking work, I made sure to spend more time with students that needed more assistance and time to fully grasp the concept. This method served two purposes; it met the academic needs of every student, and it helped manage the classroom because every student had an assignment to work on. Before I started incorporating tiered instruction, I would give one question of medium level difficulty for

the students to work on. The students who learned quickly finished the question quickly, and then proceeded to talk to their friends during class time. The students who didn't understand the concept looked at the question, and either didn't attempt the question or became discouraged when they were unable to get the answer correct. Since quite a few students would be off task, this led to issues with classroom management. With more practice and time, I eventually started giving out a variety of questions on the board per concept, ranging from easy to challenging. For my Algebra II class, it was very easy to create that range in questions. Since Geometry questions tended to be more long-winded, basic, and visual, it was more difficult to tier the questions. Towards the end of the practicum, I became very efficient at walking around the room to serve all the student's needs. I made sure to check the answers of the students who finished quickly first, and then addressed the issues for the students that were struggling. Additionally, for students that were struggling in my class, I gave them each individual reminders about extra help after school or during the day to persuade them to get the help they need. Working with them i outside of class enabled me to figure out their weak points and design practice questions to prepare them best for the quiz. Tiered instruction is a valuable method to fit the needs of students who learn at different paces, while also helping to effectively manage the classroom.

Diversity within the classroom extends further than the pace a student learns at; it extends to students who require special care due to learning disabilities or medical issues. My mentor teacher provided me with the information on all my students that had learning disabilities, and I carefully read each file. One common issue a lot of my students had was difficulty paying attention during class. To accommodate these students, I monitored their progress and made sure they were on task. While walking around the classroom, I gave gentle reminders to get back to work and checked to make sure they were working. For students that required preferential

seating, I made sure to seat those students where they needed to be when I was making seating charts. For certain students, I also made sure I repeated the directions again so the student would know exactly what they were being asked to do. Other students were uncomfortable being in large, crowded class settings. To accommodate those students, I tried to seat them in areas of the class with more space. I also gave those students encouragement and positive reinforcement when they answered questions in front of the class. Even though these students had anxiety related issues, a lot of them felt comfortable to share their thoughts with the class. Throughout the whole practicum, I made sure I assisted these students. One area that I could have improved on is paying attention to the student's organization. Being a disorganized person myself, I did not see the issue with having a messy binder. However, I quickly learned that a lack of organization can have a significant impact on student learning. If I was to return to the classroom, I would check to make sure the students were staying organized. In order to meet diverse needs within the classroom, students with disabilities need to be accommodated by the educator.

Finally, proper accommodations needed to be provided for English Language Learners (ELL) to meet the diverse language needs of the class. As discussed earlier, Doherty Memorial High School is a very diverse school, and therefore, has a lot of ELL students. While teaching the class, I kept my vocabulary as simple as possible, and made sure to explain the meaning of any mathematical terminology. I used visuals as much as possible, and spoke slowly during verbal explanations. I also encouraged my students to ask questions if they didn't understand what I said, or if they didn't know the meaning of a word I used, and my students felt comfortable speaking up. During quizzes and tests, I would walk around the classroom and encourage students to ask questions, whether they needed the directions read aloud, or a part of the exam clarified. For my students who had an ELL score of 2 or below, I spent a lot of time

working with them one-on-one, and demonstrating examples individually so they would understand it better. The benefit of teaching Algebra II and Geometry is that the questions follow similar patterns as the example questions, so the ELL students were able to make connections and figure out a majority of the problem themselves. One of the biggest issues that I faced in dealing with ELL students is the holes they had in their understanding due to a lack of proper education during their elementary school years. To ease the learning process, I allowed students to use calculators to hone the skills that were currently being taught, and not focus on basic computation. Using key strategies to assist ELL students is a component of meeting diverse needs within the classroom.

Although trying to tailor instruction to fit the needs of each student can be difficult, it is definitely a worthwhile endeavor because it helps show the class that the teacher values the learning of every single student. There are many different strategies educators can use to accommodate students with different learning styles, disabilities, and different language backgrounds. In this category, I received the grade of proficient because I adequately met the needs of each student in my classes.

Chapter 5: Safe Learning Environment

Effective classroom management is the most important component of maintaining a safe learning environment for students. If the teacher is able to manage the classroom, issues will be minimized therefore creating a positive learning environment for students. A safe learning environment is a classroom where the students respect each other and the teacher. Students should feel comfortable asking the teacher or other students for help, and are motivated about their own learning. Establishing such a space is important because if the student feels secure within the classroom, all their attention is focused on learning. Educators can use a variety of strategies to create a safe learning environment for their students.

In my classroom, I had quite a few policies and procedures to ensure every student has the best learning experience. When students entered the classroom, the expectation was that they pull out their notebooks to start the opening activity and show me their homework from the previous night. If I asked them for their attention, the students were expected to remain silent and pay attention. During the lesson, students were not allowed to talk to others, unless they had a question. Regarding classroom participation, students had to raise their hands and be called on before answering a question. If a student got the answer wrong, the other students were supposed to be respectful of everyone's answers. When a question was assigned, the expectation was that all students would work diligently. Students had to respect me as well, by avoiding being disruptive in class. Cell phones could not be used without my permission. These were a few of the most important rules that governed my classroom. If a student broke one of these rules once, they would receive a verbal warning from me. After repeated offenses, I would give the student a detention after school. Detention was a time for students to reflect on why they should improve their behavior within the class by writing a letter to me on why what they did was wrong and

how they are going to improve. I made sure I reminded students of these rules often, especially when the behavior of the class was slipping. Although these rules seem mundane and obvious, having them helped establish a productive, respectful environment. Establishing clear regulations for the class is one of the first steps to managing a classroom and creating a safe learning space.

While having clear expectations is an important step in managing the classroom, another critical component, if not the most important, is that the teacher respects the students at all times. I believe that one of the most powerful way to reach students is to show that you respect them, and take a genuine interest in their learning. I wanted every single one of my students to succeed in my classes, and they all recognized that. This was probably the most effective way to earn their respect, and thus, compliance to the rules of the classroom. Although a lot of my students admitted they do not like math, they still would try their best and remain motivated to do their assigned work. Moreover, students that would otherwise act as a major disruption to the class would listen to me when I respectfully asked them to stop. As tempting as it was to lose my temper on a student who was misbehaving, I understood the importance of keeping calm and being respectful to every one of my students. As part of respect, I tried to be kind and encouraging to my students at all times. Even if a student got an answer wrong in front of the class, I still wanted to appreciate the student sharing their answer with the class, and then guide them in right direction. Maintaining that positivity helped create a learning environment where the students felt comfortable sharing their answers with the class. When the teacher has respect for their students, it contributes to a safe learning environment.

To make sure the class remained productive, I created lesson plans that filled the class time fully. Since each class is only about forty-three minutes long, it was imperative to fill that time in order to maximize student learning. Planning in advance eliminates any extra, unused

time in class. Having the lesson and example questions prepared gives the students no extra time to talk to their friends or be a disruption. If students are not given an assignment in class, they will just talk to their friends, text on their cell phones, try to taunt other students, etc. Filling every second of time in the forty three minutes reduces the possibility of classroom issues caused from down time in class. For the unplanned disruptions during class like a phone call or a student needing a bathroom pass, I always try to give the students a quick assignment to work on, such as copying down a definition or a question, to help save time and maintain a productive environment. Additionally, transitions between questions need to be swift so students don't start being a disruption. Maintaining a productive environment is so critical because once you lose your students to their phones, or conversations with friends, it is difficult to reign the classroom back in. It is easier to have a thorough plan that eliminates the possibility of losing control. This is achieved by making sure the students are working and learning throughout the class period. With practice and time, I honed these skills to proficiency by the end of the practicum. Thorough lesson planning not only uses the time efficiently within the classroom, but it also helps create a productive, safe learning environment.

Another habit that I developed that helped create a safe, managed learning environment was standing and walking around the class as much as possible. As I learned from the instructors in ID 3100, "a teacher on her feet is worth two in a seat!" This definitely proved to be true during my classes. Walking up and down each aisle of the room allowed me to monitor the classroom effectively. Standing at the front of the classroom also helped me command the classroom by keeping the student's attention on me. Teachers need to remain standing in order to assert their authority over the classroom. If a teacher stays seated during any part of the lesson, the students will read that as a sign that they have a break, and this can lead to disruptive behavior.

Maintaining order in the classroom is essential to creating a safe environment for students. Students feel safe when they know that their teacher has the class under control.

Despite these efforts, my classes still had behavior issues on occasion, and generally from the same students each time. In a few of my classes, I had a lot of students that were enthusiastic about participating during class. However, a lot of these students would speak out of turn without raising their hands. At the beginning, I used to let this misbehavior slide because I didn't recognize the potential consequences. Although it seems minor, when students just blurt out the answer, it discourages other students from participating because it seems like the same few students are the only ones that speak during class. To create an environment where all students feel comfortable participating, I made sure to remind students every class to raise their hand. I also made sure to correct these students in a respectful way so their enthusiasm was maintained.

Another common issue, especially at the beginning of the practicum, was students talking to or joking around with their friends during class. Originally, I used to just remind the class as a whole to be quiet while I am teaching, but that wasn't effective because it didn't target the specific students that were causing the problem. I quickly realized that it was important to call out students to demonstrate that I and the rest of the class did not appreciate their behavior. This generally worked, however, when the students continued to talk to their friends, I would move their seat and give the student a detention. One successful strategy to reduce classroom chattiness is to create a seating chart. Separating students from their friends helps foster a productive learning environment. Even though the students complain about being seated away from their friends, it drastically reduces the level of distraction in class. After giving assigned seats, a few students came up to me and thanked me for being separated, because they cared about focusing

in class in order to succeed. Seating charts and reprimands are important measures in creating a safe learning environment.

In my Algebra II class, I had fewer issues with talking during class, but more issues with an overall lack of motivation. Although sleeping during class was tolerated before I started teaching, I was firmly against it as soon as I took over this class. If a student is asleep, it means they are missing out on crucial information and practice that will give them the tools to excel on the assignments and quizzes. When other students see another student sleeping, it deteriorates from the instruction because the other students start to feel that it isn't important to pay attention. Instead of ignoring this offense, I would either tap on the student's desk or ask the student next to the asleep student to wake him or her up. Additionally, I tried to keep the class as engaging as possible to help keep students awake. Investing energy into keeping class interesting and busy helps transform the classroom learning environment. Students are more motivated to pay attention and invest in their own learning when they see that the teacher is giving all their effort to making class fun. Educators need to be energized to create a learning environment where students are motivated to learn.

Finally, the last major issue that many teachers face in their class is cell phone use during class. If a student was on his or her phone, I would give a warning the first time, and then confiscate the phone the second time I saw it. Cell phones are a huge hindrance to student learning because it distracts them from the lesson. Being a student myself, I understand the temptation to use my cell phone during lecture. However, the less time I spend in class paying attention, the worse I tend to perform on the tests. In order to create the best environment for students to reach their potential, taking phones away is a necessary measure. Determining the best phone policy for the class took some time for me to figure out. There was a time where I

confiscated every students' phone at the beginning of class, but I realized that it might be too extreme of a measure. Instead, I transitioned to the system of confiscating the phone if I saw the student using it. Establishing a suitable phone policy in the classroom can help contribute to a safe learning environment.

In conclusion, creating a safe learning environment is crucial for student learning and there are many strategies educators can use to achieve this goal. For this standard, I received the score of proficient. My classroom management skills were strengthened over time and with practice. Having a clear set of policies and a set system helped contribute to my success in managing the classroom. I also made sure to treat my students with respect in order to earn their respect and obedience.

Chapter 6: High Expectations

In order to inspire and motivate students of all levels, educators need to set high expectations in their classroom. High expectations are methods and strategies teachers use to give every student the opportunity to succeed in their class. When teachers have the expectation that all students can succeed, it creates an environment where students understand that their effort, and not their innate ability, will be the main factor behind their performance. Fostering this mindset is essential for student learning because it encourages all students to put their best effort towards their education.

To set high expectations in the classroom, teachers first have to develop the mindset that every single student can succeed in their class. In order for students to believe in themselves, the teacher must believe in them first. Although it was easy to judge a student based on their current grade in the class, I made sure I saw my students as a clean slate after every quiz or test. Regardless of their previous performance, I believed my struggling students could still succeed. Moreover, I chose to ignore the judgments other people would make on my students, and instead focus on how I could help them improve. Maintaining a positive attitude about my students helped develop a functional working relationship with my classes, and motivated all my students to put effort into my class. Even though I didn't realize my students would recognize it, the fact that I believed in them meant a lot to them, and was a powerful force in my classroom. My students were aware that I saw the potential to achieve excellence in my class. Believing that every student could succeed in my class was the mindset behind establishing high expectations in my classroom.

In addition to believing in my students, I understood that success would be different for each student. For some students, I knew that barely passing was a huge accomplishment for

them, and I made sure to applaud their efforts. For other students, if they earned a B on a test or quiz and I knew they could do better, I would have a conversation with that student encouraging him or her to invest more effort in the class. Success does not necessarily mean earning an A in the class; success is when a student tries his or her best to understand the material. I emphasized this to my students as well, and this helped motivate them to put in their best effort. One of the greatest pleasures of teaching was seeing the smile on a student's face when I would praise their improvement while handing back an assignment or test. Commending a student's success is a necessary component of developing high expectations.

For students that were struggling in my class, I provided all the assistance I could to give them the tools they needed to succeed. I would also approach these students and invite them to stay after school or during school for extra help with me. Working with students individually helped me target their weak areas, and help them grow as students. During the class, I would make sure to allocate extra time for these students. Additionally, I would emphasize completion of in-class assignments and homework to boost their grades and give them more practice for the quizzes or tests. I demonstrated to my students that I was investing my best effort to help them succeed, and as a result, a lot of my students were motivated to try harder. One of the biggest challenges for me as a teacher was trying to share my positivity even after a student had failed multiple exams in my class. In my conversations with these students, I always explained that their effort would pay off, and that their current grade would not doom their success for the year. I would also go on to explain a few setbacks I experienced in my own education and how I overcame them to show them that I also struggled in school sometimes. Relating myself with my students was one of the most powerful tools because I was able to give specific advice based on my own experience, and show them that failures are a part of the path to success. When these

students received a higher grade, I would make sure to write a comment on their exam, and commend them in person. My students understood that I wasn't going to give up on them, so that motivated them to persevere in the class. Maintaining high expectations in the class can only be achieved by the teacher providing their students with all the tools they need to succeed.

Even though students who understand the concept quickly do not seem like they need any additional motivation, there were definitely a few ways I encouraged those students to challenge themselves and invest more effort towards the class. I had a few students who were very intelligent, and performed above the class average on quizzes. However, I tended to see a lack of motivation from these students. It is very easy for these students to slip under the radar because it seems like they are doing well, but in reality, they were not living up to their potential. Since they understood the concept so quickly, they didn't see the need to complete any of their homework assignments. I wanted to encourage these students to devote more time to studying because I believed it was important to instill good study habits. Developing a strong work ethic, in my opinion, included completion of all assigned work. For each of these students, I approached them individually, asking them to do their homework every day. I allowed them to come to my class during their study periods and take pictures of the textbook after class. Encouraging these students helped motivate them to start doing their homework. This improved their grades and their attitude towards learning. Additionally, high expectations means that every student can succeed in the class, which includes even the students that appear to be doing well.

In conclusion, high expectations are necessary to promote student success and the notion that success is based off hard work, and not natural ability. In this category, I received the score of proficient. I always made sure I believed in my students, and implemented that mindset into action by encouraging all students to succeed. One area of growth that I exhibited was in the area

of test design. At the beginning, my quizzes and tests were sloppy and had questions that were all of the same level of difficulty. As time progressed, I mastered creating tests with varied question types and difficulty. Additionally, I streamlined examinations to make them shorter in length to accommodate students who required more time than average to complete an assignment. Creating these adjustments helped more students succeed. Maintaining high expectations in my class was one of the main factors behind student learning.

Chapter 7: Reflective Practice

In order to grow as an educator, it is important to always reflect on the positives and negatives of the teaching strategies used in the class. Reflective practice is a critical component of a teacher's professional development and success in the classroom. Without reflecting and adjusting teaching methods, educators will stagnate by not adjusting their practice to the needs of the students. As a student teacher, I was fortunate to receive a lot of feedback from my mentor teacher, my program supervisors, and my students that enabled me to improve from my weaknesses and maintain my strengths. I tried to incorporate as much of their feedback as I could into my lesson plans, and it was evident to my supervisors and students. All of the growth I mentioned in the previous chapters was due to the constructive criticism I received from these groups. If I choose to enter the classroom again, I would make sure to continue to reflect on my performance as a teacher and adjust my practice accordingly to best fit the needs of my students.

The greatest resource I had during my practicum regarding reflective practice was the feedback my mentor teacher gave me. My mentor teacher, Ms. Richard, was almost in every class to observe, so she was able to give me feedback to make sure I was on the right path. Ms. Richard has worked as a math teacher at Doherty High School for over eight years, and even completed her student teaching practicum there as well. Her expertise and experience was invaluable in helping me grow as an educator. After receiving her feedback, I would tailor my instruction to incorporate what she had said in order to improve. One example of feedback that she gave was not only monitor whether the students were working on a question up at the board, but to also check the answers of each student before announcing the solution. As discussed earlier, I implemented this feedback into my lessons and it helped me gauge the level of understanding in the class. Another great example of feedback she gave was organizing my use

of the board. She trained me to be methodical and write on the board in an organized fashion, so it would be easier for the students to follow my work. I also used the different colored markers to color code my writing. Although these alterations seemed unnecessary at the time, these small adjustments helped make the learning process easier for my students. When the ideas, questions, and solutions are written neatly, it makes it easier for the students to follow. Additionally, from her experience as a student teacher, Ms. Richard showed me the strategies she used to lesson plan, and recommended writing out the questions I gave ahead of time to increase my confidence at the board. This piece of advice helped prepare me for the class because I had the solutions prepared in advance. Even though I wouldn't rely on my solutions while I was up at the board, it was helpful to have a hard copy of an answer key available in case I made a mistake. These were just a few examples of the feedback from my mentor teacher that I incorporated into my classroom. Since she was present in class, she was able to verify that I attempted and implemented these strategies into my instruction, and it contributed to my growth. Through the constructive criticism Ms. Richard provided, I was able to reflect on my instruction and adjust my practice accordingly.

I received a lot of feedback and advice from my program coordinators, Ms. Elmes and Mrs. Weaver, to further mold my teaching style to better fit my student's needs. IQP Seminar was used as a time to reflect on our progress, and discuss methods of improvement for each of the issues we were facing in our classes. We would either discuss real-life situations that were happening in our classrooms, or walk through hypothetical scenarios and discuss the possible solutions during these classes. These discussions helped me reflect on the challenges I was facing in the classroom, and develop strategies on how to tackle them. Through these sessions, I received a lot of advice on how to deal with my students who were struggling academically, or

students who were a disruption in class. I would then implement these strategies into my classroom, and this is what led to my classroom management policy and my approach to students who were struggling to do well in the class. Reflecting about my classroom experience in Seminar helped the program coordinators give tailored advice to remedy the issues. Another component of seminar that was quite useful was the written reflection component. Every week, the student teachers in the program were required to send in a reflection discussing the positives, negatives, and challenges of the classes that week. Additionally, we were asked to set weekly goals and track our progress. Finally, there was a different weekly question that encouraged us to think about education in a larger context. These reflections made me think critically about my performance in the class, and how I could improve. I also received weekly feedback from Ms. Weaver based on what I wrote, and her advice was always so helpful. One example of this feedback that I incorporated was how Ms. Weaver told me to reiterate my classroom management rules whenever a student broke them. This was an effective strategy in my classes, because it reminded my students of the expectations I had for them. My favorite part of the reflections was the weekly goal setting; I actively used that to think about one component of my instruction that I would improve upon, and then develop a strategy for that goal. This enabled me to try a variety of different teaching styles and methods, and if they were successful, I would continue to incorporate them into my teaching. The feedback from my program coordinators was indispensable to me during my practicum because it helped me reach the standard of reflective practice.

The last and most relevant source of feedback for me was from my students. Although I received feedback less often than I did from my mentor teacher or my program supervisors, their criticism was essential for me to learn how to meet their needs best. Before the formal survey, I

did a quick survey for my class asking them what they liked about my teaching, what they would like to see improved, and any other additional comments they had for me. Since these were sentence responses, I chose a few of the buzzwords and tallied the results to see which key areas the students wanted me to improve upon. My students appreciated my attitude towards them and their education, describing me as patient, enthusiastic, caring, relatable, and supportive. They also liked the way I explained notes at the board, and how I would entertain questions at any point during the class. Those buzzwords and phrases helped encourage me to still maintain that welcoming attitude towards my students. My students were quite insightful when it came to constructive criticism as well. The main piece of criticism I received was to dedicate more time in a subject before quizzing. This was the most challenging piece of feedback to implement, since the curriculum for Honors classes specifically was stringent in terms of deadlines. However, I was able to plan the unit of Reasoning and Proof over the span of three weeks to accommodate the students. The students were grateful for having had the extra time, and it showed in their quiz results. Another crucial component of class that they wanted me to improve upon is the time they had to work on practice questions in class. My students wanted more time during class to think and reflect upon what they had learned, so I incorporated their feedback. Instead of rushing through questions and concepts, I would pause and give more practice questions during class time. Finally, a few students asked for me to spend more time going over homework during class, so I scheduled that into my lesson planning and made that a priority in my classroom. Listening to the criticism my students had for me was a necessary piece of my reflective practice and growth as a teacher.

In conclusion, I reached proficiency in the standard of Reflective Practice because I dedicated time to incorporating the feedback I received from my mentor teacher, program

coordinators, and my students. I was always welcome to hearing feedback from others, and I would consistently try to maintain the feedback I implemented. Regarding potential growth, I would definitely try to poll my students more often to see how I could improve in the classroom. If I was to enter the classroom again, I would give the informal survey around once a month so my students would play a greater role in my improvement as an educator.

Worcester Polytechnic Institute Education

Although I am a Chemical Engineering student, there were multiple classes that helped provide me with the necessary knowledge and skills to teach high school. Before entering the class as a student teacher, one course that greatly prepared me for my student teaching practicum was ID 3100: Teaching Methods in Math and Science. It was taught by the Math Department head, Mrs. Renah Razzaq, and the Science Department Head, Mr. John Staley, from Doherty High School. These classes were invaluable in preparing me for the challenges my classes would propose, and how to handle them. One of the most important concepts I learned was effective lesson planning. Mr. Staley and Mrs. Razzaq explained the best practices for the structure of a class, and helped the other student teacher candidates and I design lesson plans on our own. We received feedback on each of the lesson plans we submitted, and this feedback helped shape my lesson plans during my student teaching practicum. Following their format gave me a solid foundation for how to plan and structure a lesson when I was a teacher. We also learned classroom management strategies to minimize the number of behavior issues in our classes. As part of the course, we were asked to simulate lessons with the other student teachers candidates in the class. Each student would have a turn at pretending to be a teacher and run through a brief twenty minute lesson. Mr. Staley, Mrs. Razzaq, and the other remaining student teachers would pretend to be the students, and each would be assigned a different behavioral issue. These simulations helped us practice teaching a lesson based on a lesson plan, along with dealing with trouble students in the class. These practice sessions helped me anticipate and prepare myself for teaching during my practicum. Finally, Mr. Staley and Mrs. Razzaq shared their experiences as teachers to give us a picture of what to expect. Being high school teachers themselves enabled them to impart relevant and critical tips and tricks for being teachers in our own classes.

In terms of content preparation, the WPI Chemical Engineering curriculum incorporates a mathematics in many different classes required for graduation. I taught two different subjects as a student teacher: Algebra II and Geometry. Regarding my Algebra II preparation, almost every engineering course required the use of basic algebra. My Calculus III, Calculus IV, and Differential Equations classes required us to have to isolate variables, and this skill is what I had to help students with during classes. The problems in my chemical engineering and engineering science courses required solving systems of equations and other algebra skills. Geometry was incorporated in a lot of basic physics questions as well. In my Principles of Physics: Mechanics course and my Introduction to Biomechanics and Biotransport course, I had to use the given geometry to calculate stresses and forces. My experience in these courses helped me illustrate the potential applications for the math that I was teaching. I stressed in my classes that algebra and geometry were used in numerous engineering problems. Illustrating the mathematical applications helped demonstrate the relevance of what the students were learning. My WPI education prepared me for the content and application required to teach in the classroom.

My Classes

Period 6: Honors Geometry

The first class I took over was Ms. Richard's Period 6 Honors Geometry class. Since I took over the class so early, I developed the strongest connection with these students. Period 6 had such a wide range of personalities, and a lot of energy. Although this energy could be difficult to manage at times, their energy made it a fun, memorable class to teach. Like my other Honors Geometry courses, many of the students had friends within the class. When friends were seated next together, they tended to talk or distract each other from the lesson. In this class and the other Honors Geometry classes, I gave assigned seats. With Period 6 in particular, I had to make sure that students would stay in their assigned seats. This class gave me the most difficulty and pushback when it came to assigned seats, so I had to check the seating chart almost every day to make sure everyone was in the right spot. Period 6 was always honest with me and felt comfortable expressing their opinions in the class. They were also the most intellectually curious out of all the classes. Many students in this class were ready for a challenge, and were interested in the applications of the math they were learning. For these students, I made sure to add extra, more rigorous problems up at the board. Although I had a few of my most motivated students in this class, I also had a few students who were struggling to pass the class and understand the material. To address their needs, I made sure I was available after school or during my non-teaching periods in order to help them out. I would talk with them individually to invite them for tutoring. After much persistence, they agreed to come. With one-on-one help, I was able to pinpoint their weaknesses and connect with them. One student in particular was doing very poorly in the class, and was starting to give up hope in the class and in school. For a few weeks, this student would not focus in class. If the student wasn't trying to distract others, the student

would lie down on their desk. I spoke to this student multiple times individually to encourage the student to attend extra help. When this student attended extra help for the first time, I was able to talk to the student and encourage the student to keep persevering despite their poor performance in the class. I also was able to strengthen the student's foundations in math and this gave them the confidence to stay in the class. After the first session, this student would come consistently to extra help sessions before exams. Fortunately, this also started to reflect in their grades and I noticed gradual improvement. Working with and encouraging this student one-on-one motivated the student to try their best to succeed in the class. Despite the high-energy and polar extremes of the class, Period 6 was a pleasure to teach.

Period 5: Honors Geometry

The second class I took over was Period 5 Honors Geometry. Period 5 was definitely the most balanced class out of all the classes I taught. The students were focused, hardworking, and always willing to impress me. While this class was generally well-behaved and driven, the students had the potential to be the most disruptive, unruly class I had. If I commanded their attention, by being in front of the room and prepared to teach, they were ready to listen. However, if I was unprepared, the class would go into chaos. In order to prevent the class from unraveling, I made sure that I was always prepared and confidant. Once I established my routine for the class, the students would come into class knowing exactly what was expected. The one unusual challenge I faced in this class was higher levels of hostility towards other students, either physically or verbally. Although a majority of the time these behaviors were done in a joking manner, I made it clear, even before I took over the class that such behavior would not be tolerated. I reiterated these rules often, and my students respected them almost all the time. One student in this class was one of my biggest behavioral challenges. While this student did

relatively well in the class, the student tried to disrupt class at every point possible. The student would taunt other students, attempt to taunt me, to name just a few of the disruptive behaviors. When it became clear that moving the student's seat and verbal warnings were not enough, I gave the student a detention. After making this student write a two page long essay on why it is important to respect the others and me during class time, the student started to behave in order to avoid having to attend detention and write another essay. While I still had behavior issues from this student, having the increasing levels of punishment helped address that. I also made sure to remain professional every time I had to reprimand the student. I was firm, but always respectful. This student appreciated my patience and respect, and this further motivated them to behave and respect me. Another unexpected problem I had with this student was from the student's interactions with others. Period 5 tended to be very protective of me, and had tremendous respect for my time and effort. However, this led to occasional aggression towards disruptive students in a negative manner. Instead of nicely telling disruptive students to quiet down, the other students would make rude, aggressive comments before I could address these students myself. In order to regain control, I reminded the entire class that the class had to respect other students in my class, not just me. I also became swifter at addressing behavioral issues in the class, in order to prevent other students from escalating the situation. Period 5 was a wonderful class to teach, despite the challenge of getting students to respect each other

Period 7: Honors Geometry

The final Honors Geometry course I taught and took over was Period 7. While the other Geometry classes had a more even mix of sophomores and freshmen, Period 7 was almost entirely a freshman class. This age group greatly influenced the classroom dynamics. Since most of these students had just graduated from middle school, a lot of them still exhibited immature,

disrespectful behaviors. Period 7 had the greatest behavior and inattention problems in comparison to my other classes. Classroom management for this specific class had to be more strict and with more frequent reminders. Although I initially was hesitant to have an iron grip on the class, I realized that it was important for their focus and understanding to adopt a more strict personality. Rather than being patient with first offenses, I needed to escalate punishments faster in this class in order to exert control over the classroom. I also had to provide constant reminders for how students should behave. While all these students needed were verbal reminders, they needed to be frequent and specific. As exhausting and frustrating as this class could be sometimes, I tried to stay energized and respectful. However, since this was my last class of the day after teaching for three consecutive classes, I was generally drained. Since many of my students came to my classroom to visit multiple times a day, many of them picked up on the difference in my energy level throughout the day. These students shared that I was generally more positive, peppier, and enthusiastic in my other classes. Immediately upon hearing this, I made a conscious effort to stay focus and energized for Period 7 as well, even when they were disruptive or inattentive. The class noticed and appreciated that I tried my best to stay energized. Even though this class was more difficult than the other classes, I also made sure to emphasize my appreciation of the class and the students. I always treated students respectfully, while still maintaining my classroom rules. Although Period 7 presented many challenges, I was able to discover strategies to effectively manage their class.

Period 4: College Algebra II

The College Algebra II class that I took over was a significantly different teaching experience in comparison to the Honors Geometry classes. One difference was the level of rigor. The Geometry classes I taught were all at the Honors level, so the academic expectations were

higher and more demanding than College level. For College level classes, the material is taught at a much slower pace, and notes are allowed on quizzes and tests. Effort and hard work are also factored more heavily than academic performance in College level courses than in Honors. Students in College level classes tend to need more direction and instruction from the teacher as well in order to fully master the material. Another difference was in the subject matter. Although I liked Geometry, I loved Algebra II. As an engineering student, I used algebra more often than geometry, so the content was more natural and easier for me to teach. As a result, I was more passionate about the material. However, the biggest difference between Honors Geometry and Algebra II was the classroom environment. My Honors Geometry classes were entirely underclassmen, whereas the Algebra II class I taught was all juniors and seniors. Since the Algebra students were older, they tended to be more mature, however, they also tended to be more apathetic and unmotivated. Before I took over the class, a majority of the students were either asleep on their desk or on their phones during instruction. Even though they were not verbally disruptive like my other classes, this was still an important behavioral issue and a hindrance to their learning. I understood that my biggest challenge with this class would be motivating them to pay attention during class. In this class, I made sure to be enthusiastic and try and make class as interactive as possible. To make sure students paid attention, I would cold call. I also did not tolerate phone use or sleeping in class. I would call out students who are asleep or knock on their desk. For phones, I would confiscate them as soon as I saw them out. Although I thought the transition to a livelier, more participating class would take longer, the class was starting to improve within weeks. Every student was starting to engage in their learning in the class, by participating in problems up at the board or individually. Students who were originally shy felt comfortable asking me questions in class, whether it was during lecture or one-on-one.

More students started finishing their homework as well, even though this measure took much longer to see results. This class transformed from a sleepy classroom to an active, competitive, positive learning environment. Even though Algebra II was a College level course, I wanted every single student to be motivated and engaged in the learning process.

Feedback

I received similar feedback from all my classes since my teaching style and personality remained consistent. One weakness that a few students mentioned was my disorganization at the board. At the beginning, my flow of notes was disconnected and difficult to follow. However, I mimicked Ms. Richard's strategies and used color coding and flow, and incorporated it into my teaching style. This organization helped the students follow the notes more easily. Another weakness that the survey helped draw my attention to was cooperation during class. Originally, I would not encourage students to work together since I did not want them to get distracted. As time progressed, I realized that student discussion would be critical for their learning and understanding. While doing examples up at the board, I would verbally encourage students to work with the people near them to solve the problems. This allowed them to practice cooperative skills, along with assisting each other with the math. My main weakness was how I paced my lessons, specifically in the Honors Geometry classes. I tended to cram a lot into one lesson, and a lot of the students felt rushed to learn the material. To accommodate their needs, I decided to pace the unit of Proofs and Logical Reasoning more slowly. My students appreciated the extra time for them to practice. However, since the Honors curriculum is run at a stricter, faster pace, I could not always be lenient with the pace of the class. Despite the fast pace, I would still always try to be available to students for extra help if they had trouble keeping up. This was one of the biggest strengths my students discussed in the feedback surveys. My students said I was

approachable and caring; they knew that I wanted to see them succeed and would spend as much time as they required to grasp the material. They also appreciated how inviting I was during class for them to ask questions, whether it was in front of the class or individually at their desks. My students felt very comfortable with me, and I thought this was critical to my success in the classroom. The final recurring theme in the feedback surveys was my attitude. My students called me positive and enthusiastic, and this helped motivate them to focus and put effort into the class. The feedback my students provided was essential to my growth as a teacher.

Parent Interaction and Professional Development

Parent interaction was another critical component of my time as an educator. One notable experience I had was during an IEP meeting. As one of the student's teachers, I had to speak to the student's performance in the class, both academically and behaviorally. This student was one of the most intellectually curious students I had. The student was always asking for more challenging problems, for me to check their work, and the potential applications of the math we were studying. Even though the student needed reminders to stay organized and pay attention, the student had shown improvement from previous years in their academic performance and behavior. It was a pleasure to share my thoughts on the student's performance with the student's parent. After I was done sharing, it was evident to see the pride on the parent's face. It made me aware of how invested a parent is in their student's education, and how proud it makes parents to see their child succeed.

Professional development is another critical component of an educator's growth. It allows the teacher to discuss strategies with other teachers, and maintain coherency and cooperation within the department. I attended one of the afterschool Mathematics Department meetings. The department head, Mrs. Razzaq, runs these meetings. At this particular meeting, the teachers were

learning how to use a new piece of software and take care of a few logistical items on the internet. This meeting helped me see more of the teacher responsibilities outside the classroom.

Conclusion

My time as a student teacher at Doherty Memorial High School was an invaluable and memorable experience. I learned many strategies and practices that helped me grow and achieve proficiency in the six essential elements of CAP: well-structured lessons, adjustment to practice, meeting diverse needs, safe learning environment, high expectations, and reflective practice. If I were to pursue the field of teaching in the future, I recognize the areas I still need improvement in and work to attain the goals discussed in the previous chapters. Although I have focused upon specific strategies and skills I used to improve my practice, I want to conclude on the guiding principle that truly helped me achieve success as teacher. No matter what the students thought of themselves or their ability, I always made sure I believed in them. This helped every component of my teaching experience come together. My students recognized my faith in them, and as a result, responded with respect towards me and enthusiasm to learn. Belief in your students is the most powerful force a teacher can have on a classroom. Observing different teachers in the school and in my own high school experience attest to this fact as well. Even though I was only at the school for a few months, observing and teaching classes shaped my teaching style. Student teaching at Doherty High School for a semester was the most rewarding experiences at WPI, and I am so lucky for having had this opportunity. I hope I have another opportunity in the future to return to the classroom.

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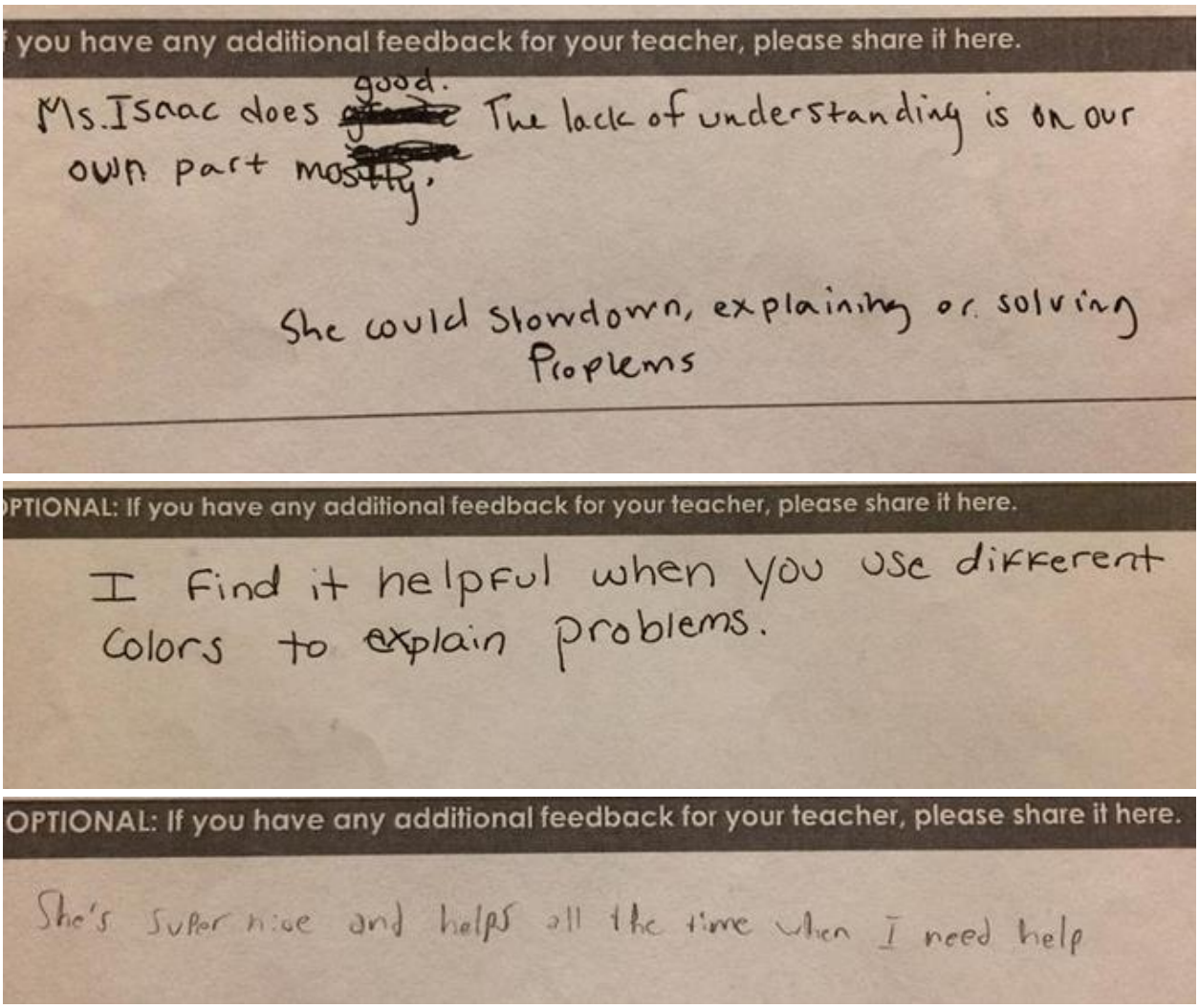
7. "School Nutrition." *Worcester Public Schools,* Accessed February 2017. http://worcesterschools.org/school-nutrition
8. "Mathematics." *Worcester Public Schools,* Accessed February 2017. http://worcesterschools.org/curriculum/mathematics

Appendix

Appendix A: Feedback Survey Comments



f you have any additional feedback for your teacher, please share it here.

Ms. Isaac does good. The lack of understanding is on our own part mostly.

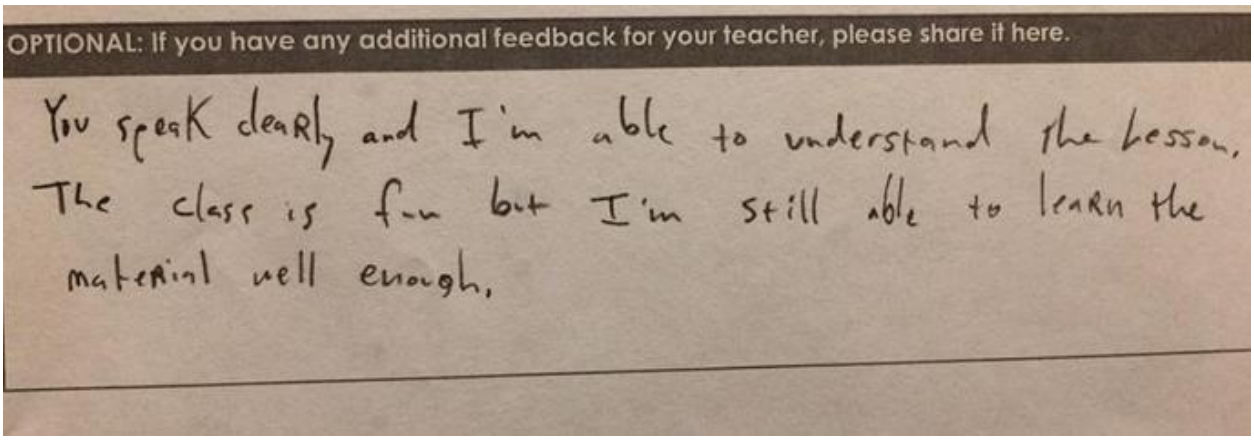
She could slowdown, explaining or solving Problems

PTIONAL: If you have any additional feedback for your teacher, please share it here.

I find it helpful when you use different colors to explain problems.

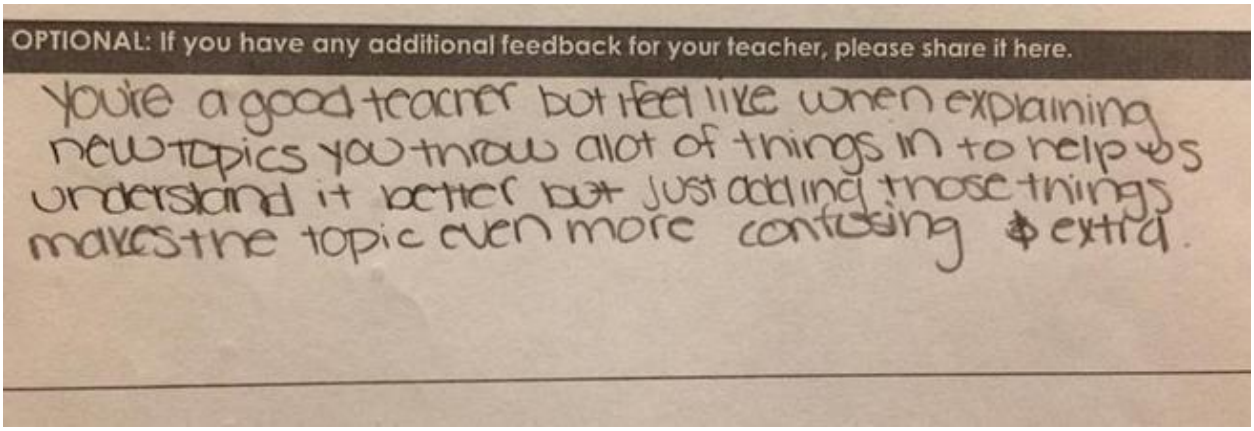
OPTIONAL: If you have any additional feedback for your teacher, please share it here.

She's super nice and helps all the time when I need help



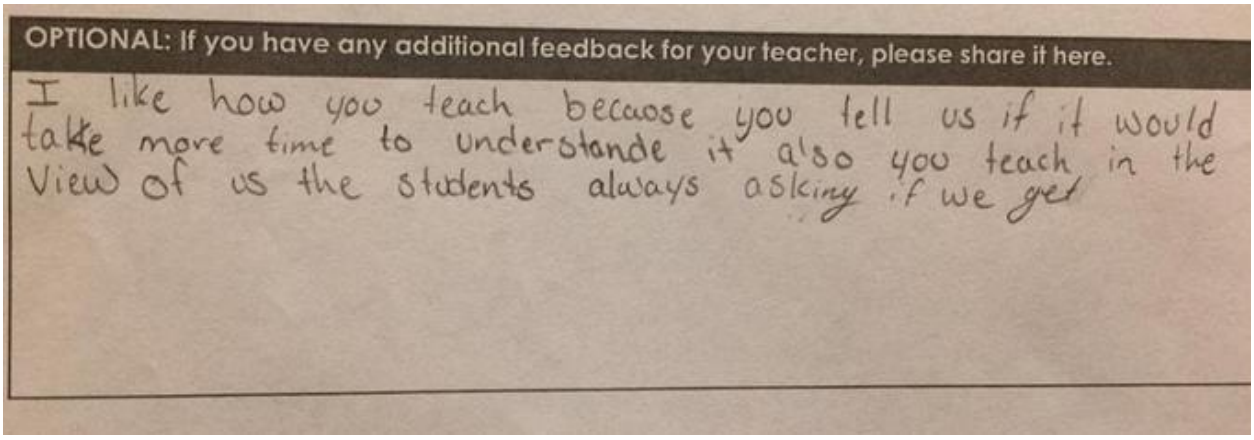
OPTIONAL: If you have any additional feedback for your teacher, please share it here.

You speak clearly and I'm able to understand the lesson. The class is fun but I'm still able to learn the material well enough.



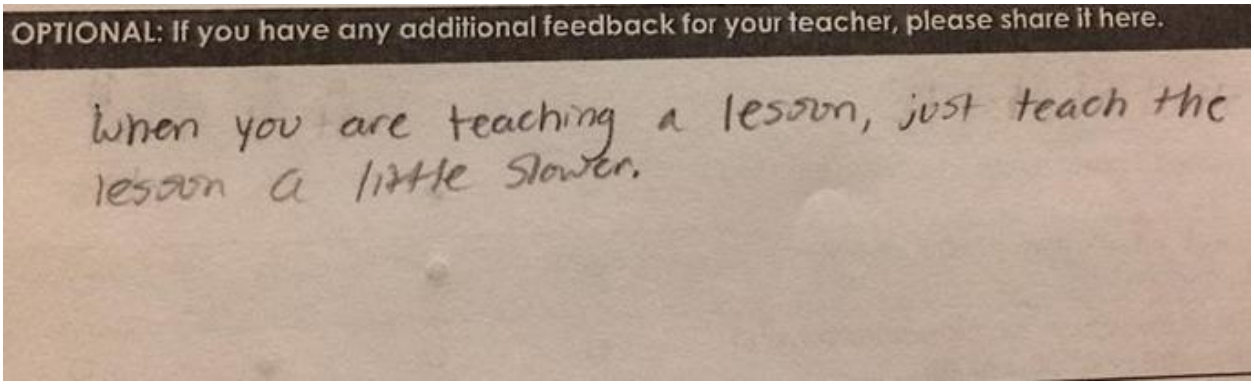
OPTIONAL: If you have any additional feedback for your teacher, please share it here.

You're a good teacher but I feel like when explaining new topics you throw alot of things in to help us understand it better but just adding those things makes the topic even more confusing & extra.



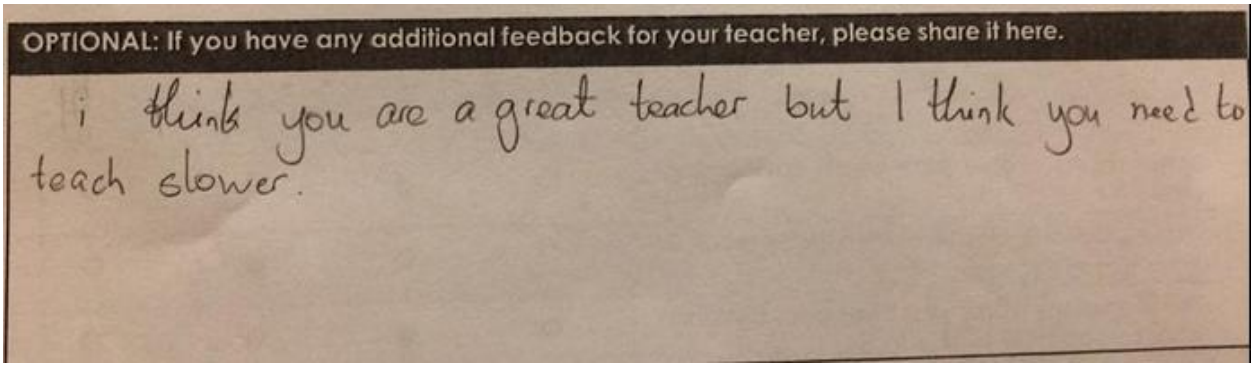
OPTIONAL: If you have any additional feedback for your teacher, please share it here.

I like how you teach because you tell us if it would take more time to understande it also you teach in the View of us the students always asking if we get

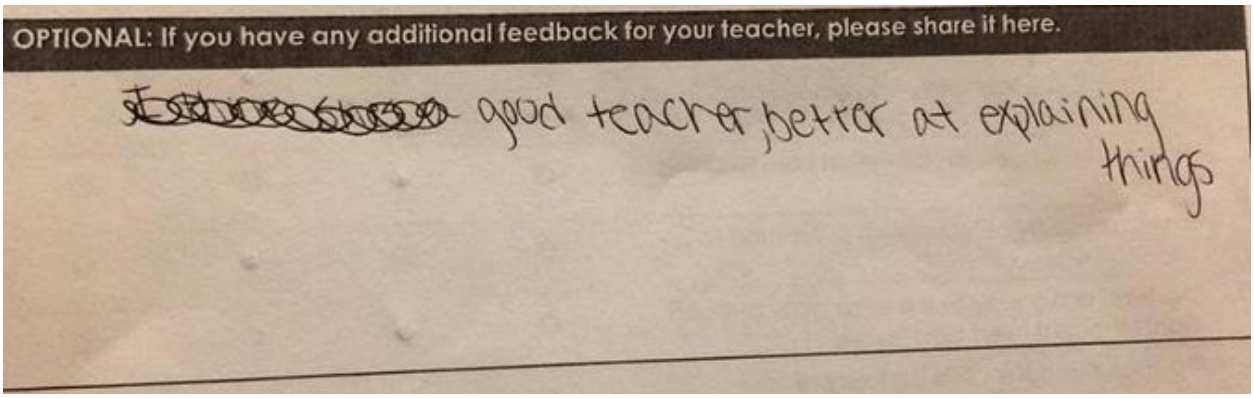


OPTIONAL: If you have any additional feedback for your teacher, please share it here.

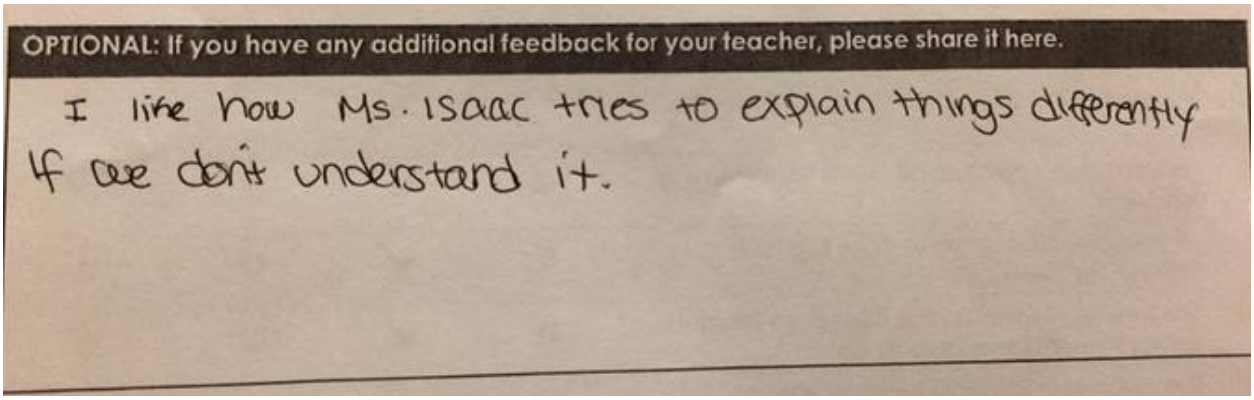
When you are teaching a lesson, just teach the lesson a little slower.


OPTIONAL: If you have any additional feedback for your teacher, please share it here.

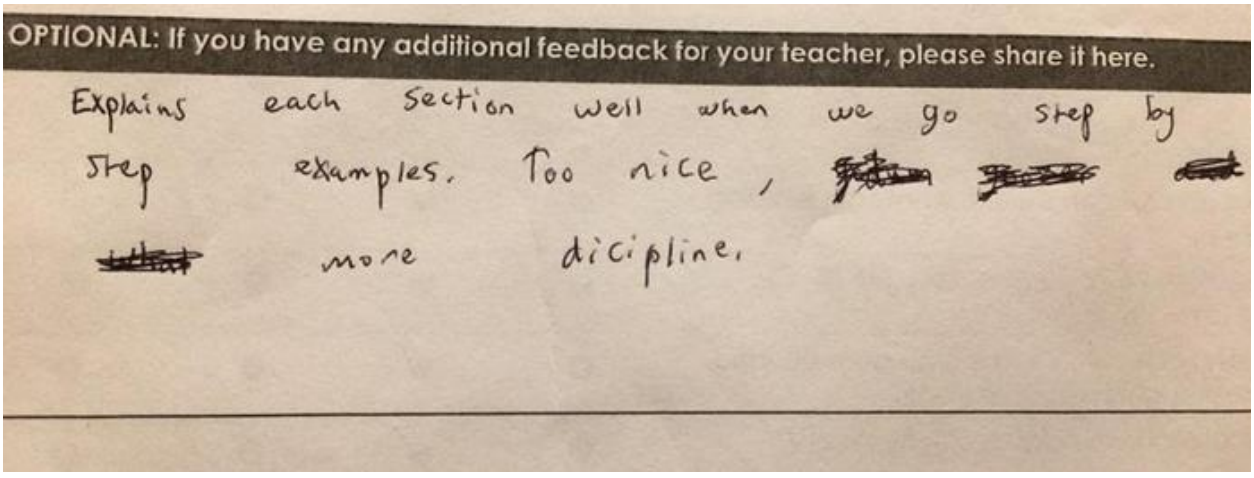
i think you are a great teacher but I think you need to teach slower.


OPTIONAL: If you have any additional feedback for your teacher, please share it here.

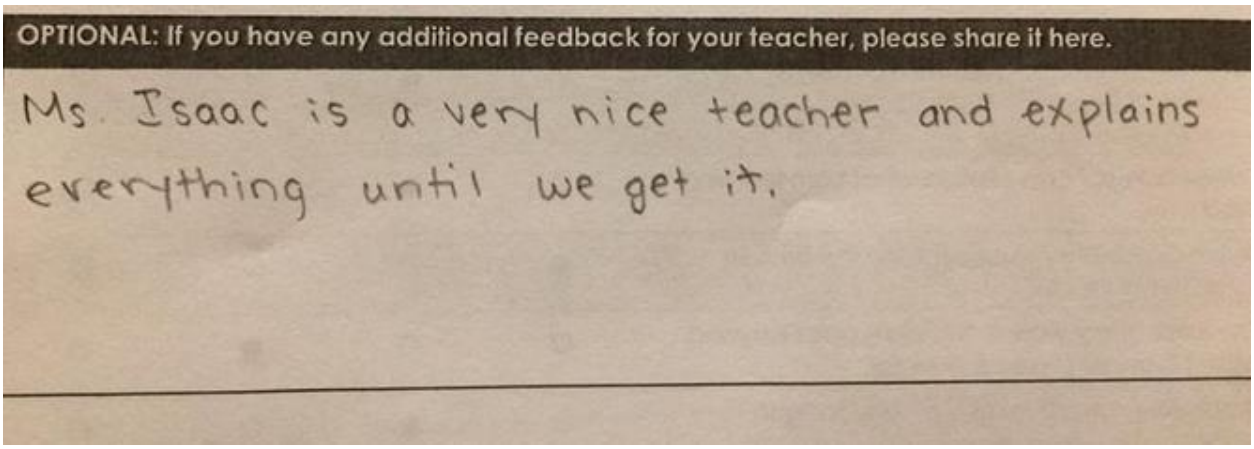
[redacted] good teacher, better at explaining things


OPTIONAL: If you have any additional feedback for your teacher, please share it here.

I like how Ms. Isaac tries to explain things differently if we don't understand it.

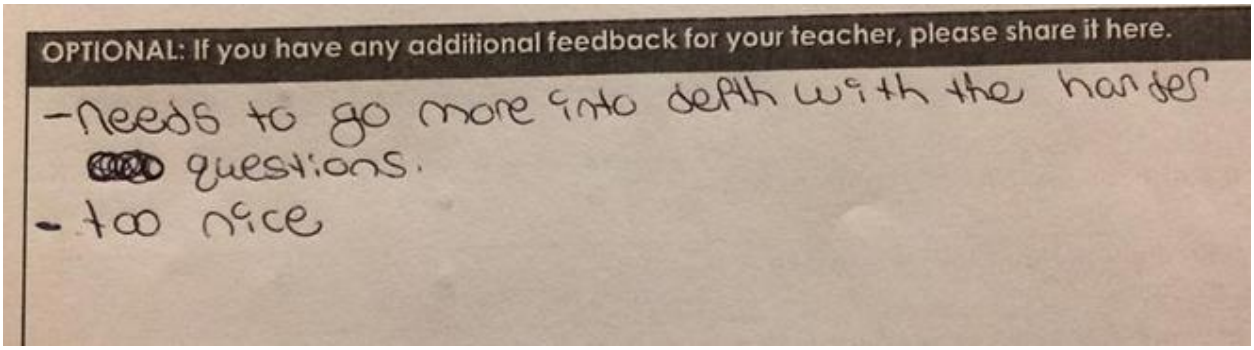

OPTIONAL: If you have any additional feedback for your teacher, please share it here.

Explains each section well when we go step by step examples. Too nice, [redacted] more dicipline.



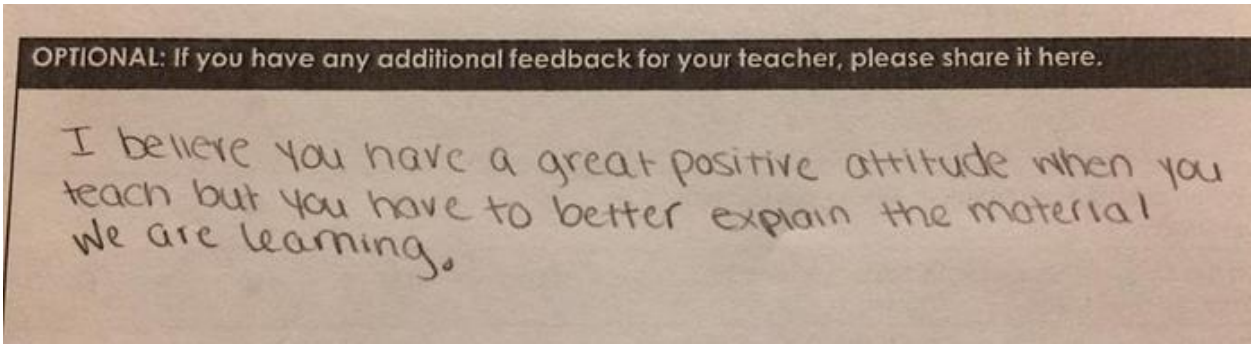
OPTIONAL: If you have any additional feedback for your teacher, please share it here.

Ms. Isaac is a very nice teacher and explains everything until we get it.



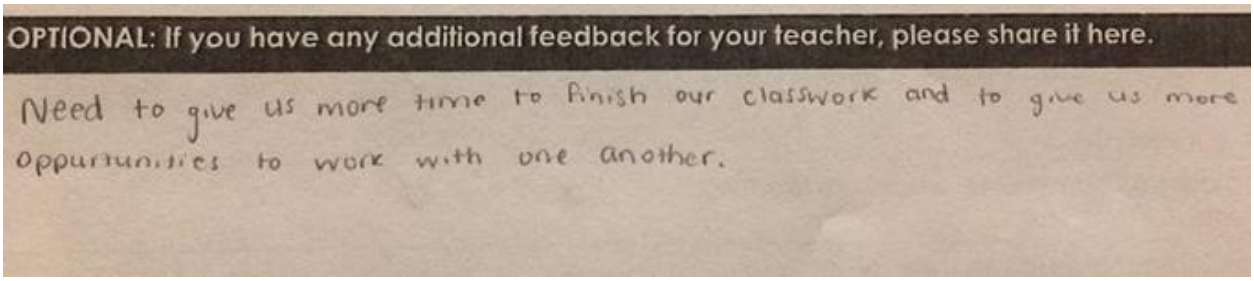
OPTIONAL: If you have any additional feedback for your teacher, please share it here.

- needs to go more into depth with the harder questions.
- too nice



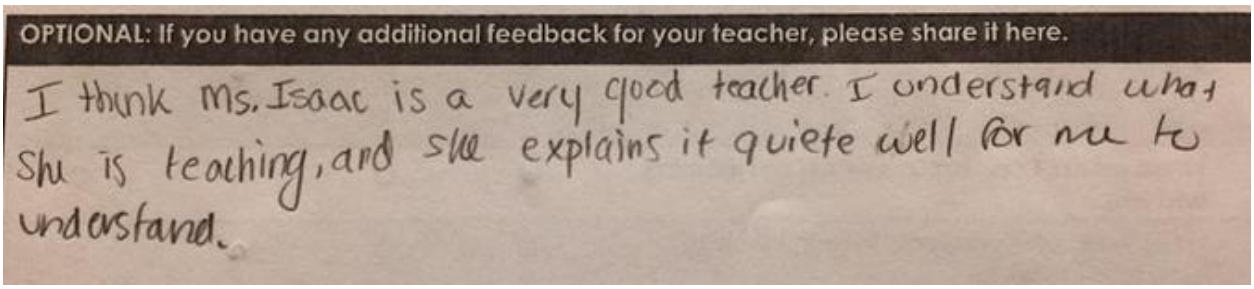
OPTIONAL: If you have any additional feedback for your teacher, please share it here.

I believe you have a great positive attitude when you teach but you have to better explain the material we are learning.

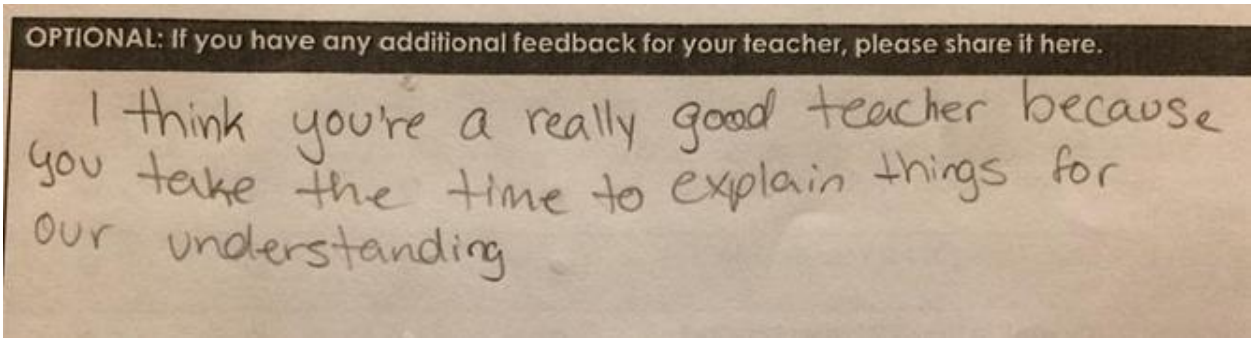


OPTIONAL: If you have any additional feedback for your teacher, please share it here.

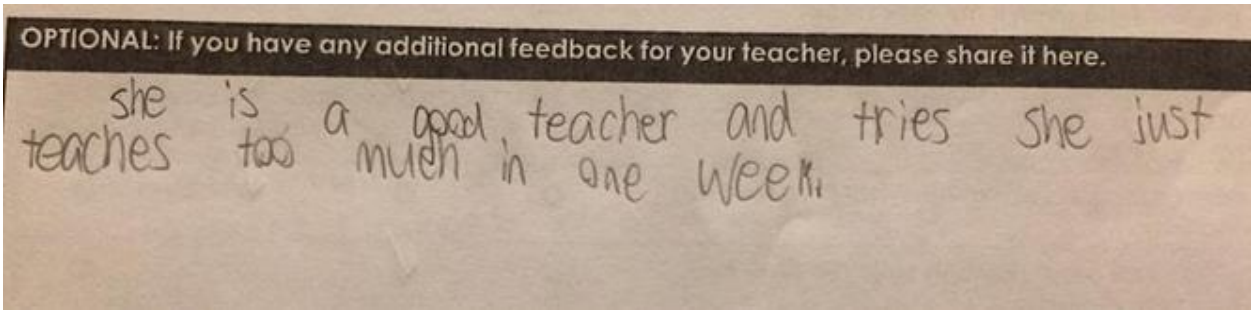
Need to give us more time to finish our classwork and to give us more oppurtunities to work with one another.


OPTIONAL: If you have any additional feedback for your teacher, please share it here.

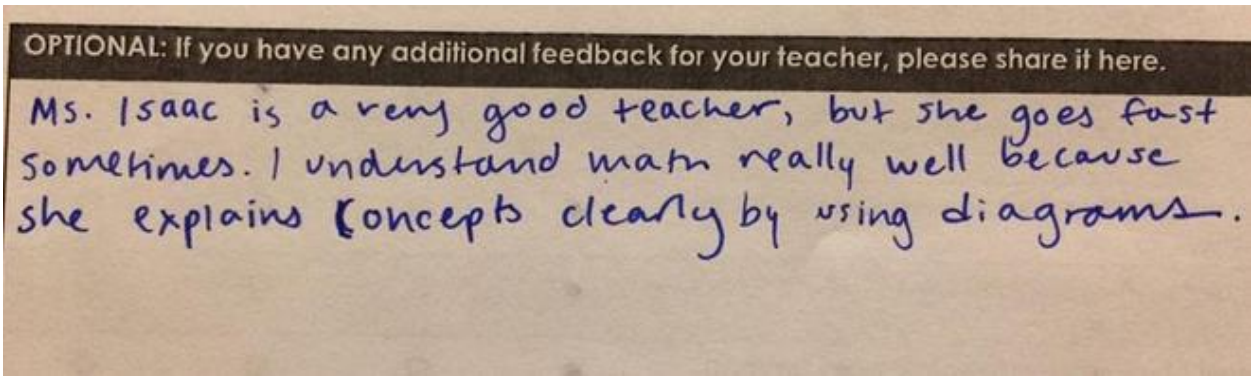
I think Ms. Isaac is a very good teacher. I understand what she is teaching, and she explains it quiete well for me to understand.


OPTIONAL: If you have any additional feedback for your teacher, please share it here.

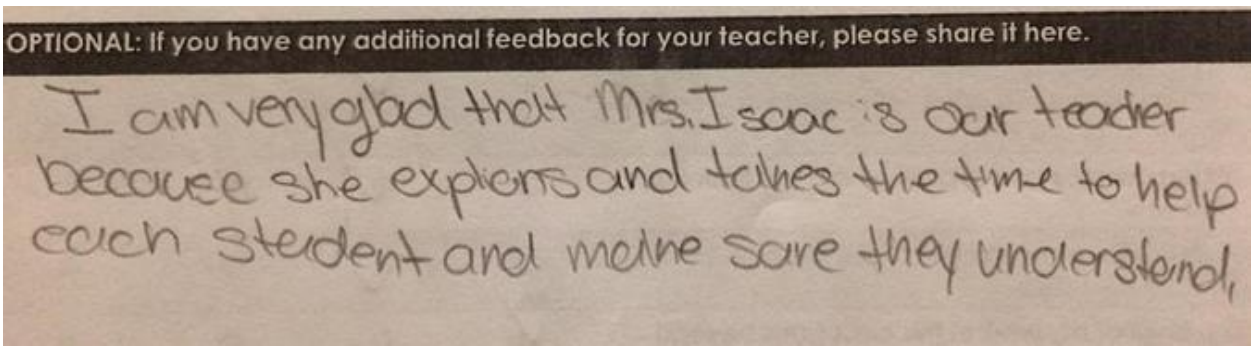
I think you're a really good teacher because you take the time to explain things for our understanding


OPTIONAL: If you have any additional feedback for your teacher, please share it here.

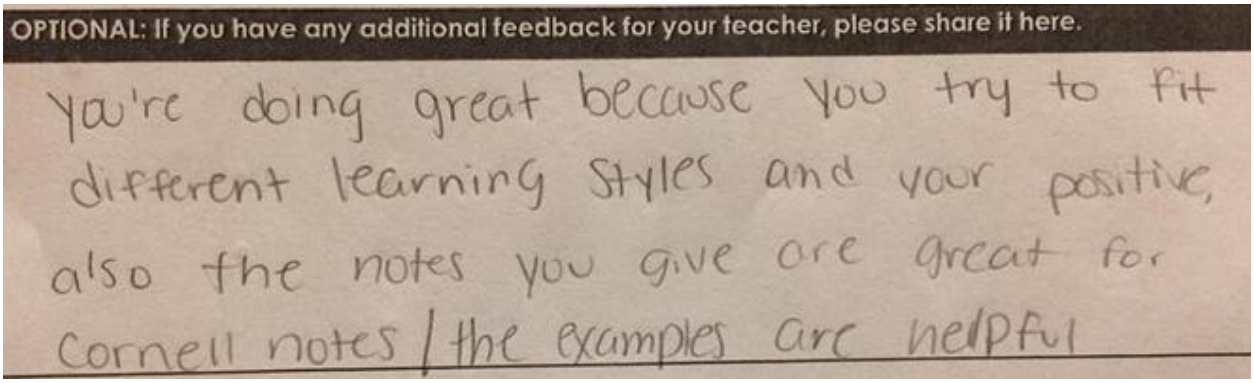
she is a good teacher and tries she just teaches too much in one week.


OPTIONAL: If you have any additional feedback for your teacher, please share it here.

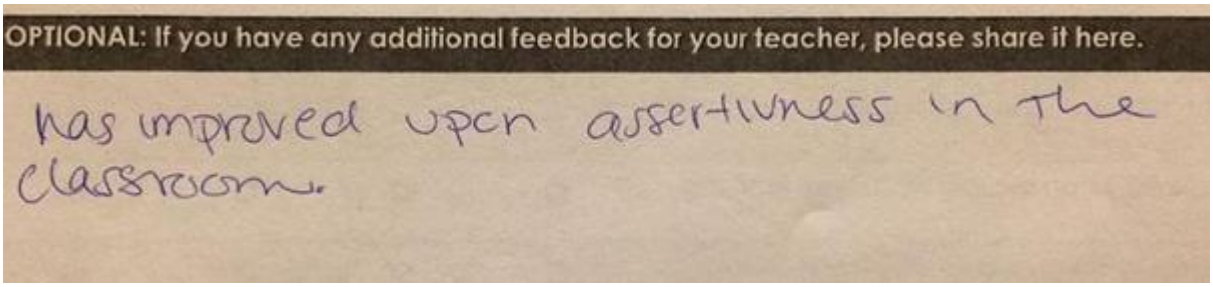
Ms. Isaac is a very good teacher, but she goes fast sometimes. I understand math really well because she explains concepts clearly by using diagrams.


OPTIONAL: If you have any additional feedback for your teacher, please share it here.

I am very glad that Mrs. Isaac is our teacher because she explains and takes the time to help each student and make sure they understand,


OPTIONAL: If you have any additional feedback for your teacher, please share it here.

You're doing great because you try to fit different learning styles and your positive, also the notes you give are great for Cornell notes / the examples are helpful


OPTIONAL: If you have any additional feedback for your teacher, please share it here.

has improved upon assertiveness in the classroom.

Appendix B: Student Work

Projects

Triangle Congruency Project!

DUE DATE: November 30th

Instructions:

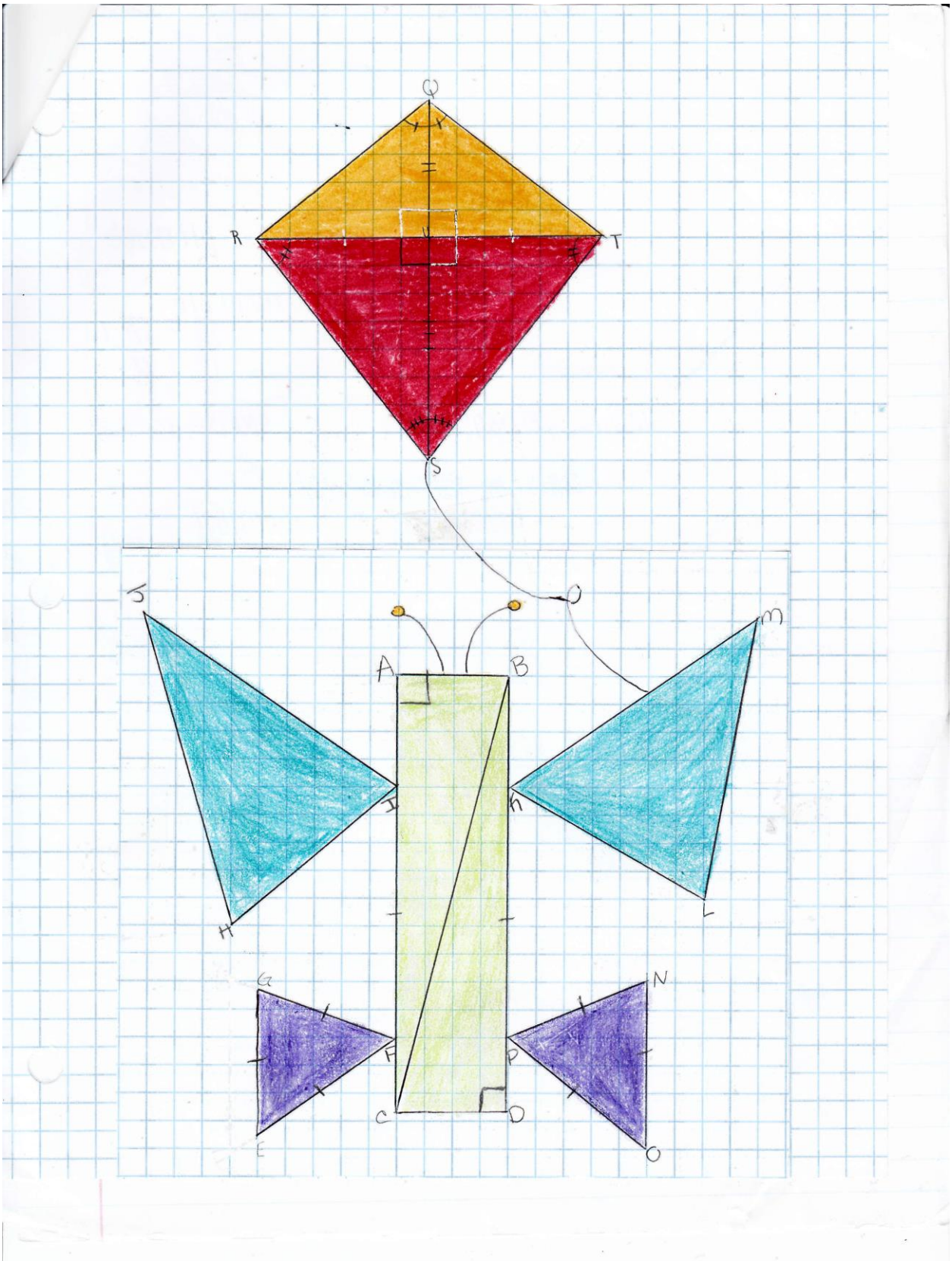
1. Construct a real life object or a work of art to illustrate your understanding of congruent triangles. **Use all five criterions (SSS, SAS, AAS, ASA, HL) for congruency to make your model.** Label each **vertex** of each triangle with a **different letter.**
   a. You should have **at least 10 triangles** in your final project.
2. Please mark all the congruent triangles for identification. They should be **color coded to showcase one congruency criterion using that one color.** (For instance, the two triangles with ASA criterion could be colored red). The angle and the side measures should be labeled and filled in the attached table.
   a. Use a **ruler** to prove congruent sides
   b. Use a **protractor** to prove congruent angles
3. Examples for this project: a model bridge made of congruent triangles; a decorative window or door in a building; a computer generated graphic design. Be creative!
4. **Write 2-column proofs** for each set of congruent triangles to prove their congruency.
5. Write a **brief reflection** on either of the two topics below. Pick one topic.
   a. How can triangle geometry be applied in everyday life?
   b. Why are proofs (logical reasoning) important? Apply to a non-mathematical situation.
6. Fill out the **table** on the next page with all the information required.

Criteria	Point Value
SSS Proof	10 10 ✓
SAS Proof	10 10 ✓
AAS Proof	10 10 ✓
ASA Proof	10 10 ✓
HL Proof	10 7
Neatness	10 10 ✓
Creativity	10 10 ✓
Reflection	10 0
Completion of table	10 10 ✓
Directions (labeled vertices? Different colors for different sets of congruent triangles?)	5 5 ✓
Effort ("going the extra mile")	5 0
TOTAL	**100**

82

so neat and pretty! no reflection?

Criterion	Part of Drawing	Color of triangles used in model to represent this criterion	Appropriate markings/measurements (Write down side lengths and angle measures to prove congruency)
SSS	Small wings on butterfly	Purple	S-4cm $\overline{GE} \cong \overline{NO}$ S-4cm $\overline{NP} \cong \overline{GF}$ S-4cm $\overline{EF} \cong \overline{OP}$
ASA	top of Kite	yellow	A-$\angle RQU \cong \angle TQU$ S- $\overline{QU} \cong \overline{QU}$ A-$\angle QUR \cong \angle QUT$
SAS	Big wings on butterfly	Blue	S - 7cm $\overline{JI} \cong \overline{MK}$ A -42° $\angle HJI \cong \angle LMK$ S - 7cm $\overline{JH} \cong \overline{ML}$
AAS	bottom of Kite	orange	A-$\angle SRU \cong \angle STU$ A-$\angle RSU \cong \angle TSU$ S- $\overline{US} \cong \overline{US}$
HL	Body of Butterfly	Green	H-10 cm, $\overline{BC} \cong \overline{BC}$ L-10cm $\overline{AC} \cong \overline{BD}$


Q
R
T
S
J
O
m
A
B
I
h
H
L
G
N
F
P
C
D
E
O

Butterfly

SSS Congruence postulate

Statement	Reason
1. $\overline{GE} \cong \overline{WO}$, $\overline{WP} \cong \overline{GF}$, $\overline{EF} \cong \overline{OP}$	1. Given
2. $\triangle GEF \cong \triangle WOP$	2. SSS congruence postulate

SAS congruence postulate

Statement	Reason
1. $\overline{JI} \cong \overline{MK}$, $\angle HJI \cong \angle LMK$, $\overline{JH} \cong \overline{ML}$	1. Given
2. $\triangle HJI \cong \triangle LMK$	2. SAS congruence postulate

HL congruence theorem

Statement	Reason
1. $\overline{BC} \cong \overline{BC}$, $\overline{AC} \cong \overline{BD}$, $\angle BAC \cong \angle CDA$	1. Given
2. $\triangle ABC \cong \triangle BCD$	2. HL congruence theorem

have to mention something about the triangles being right

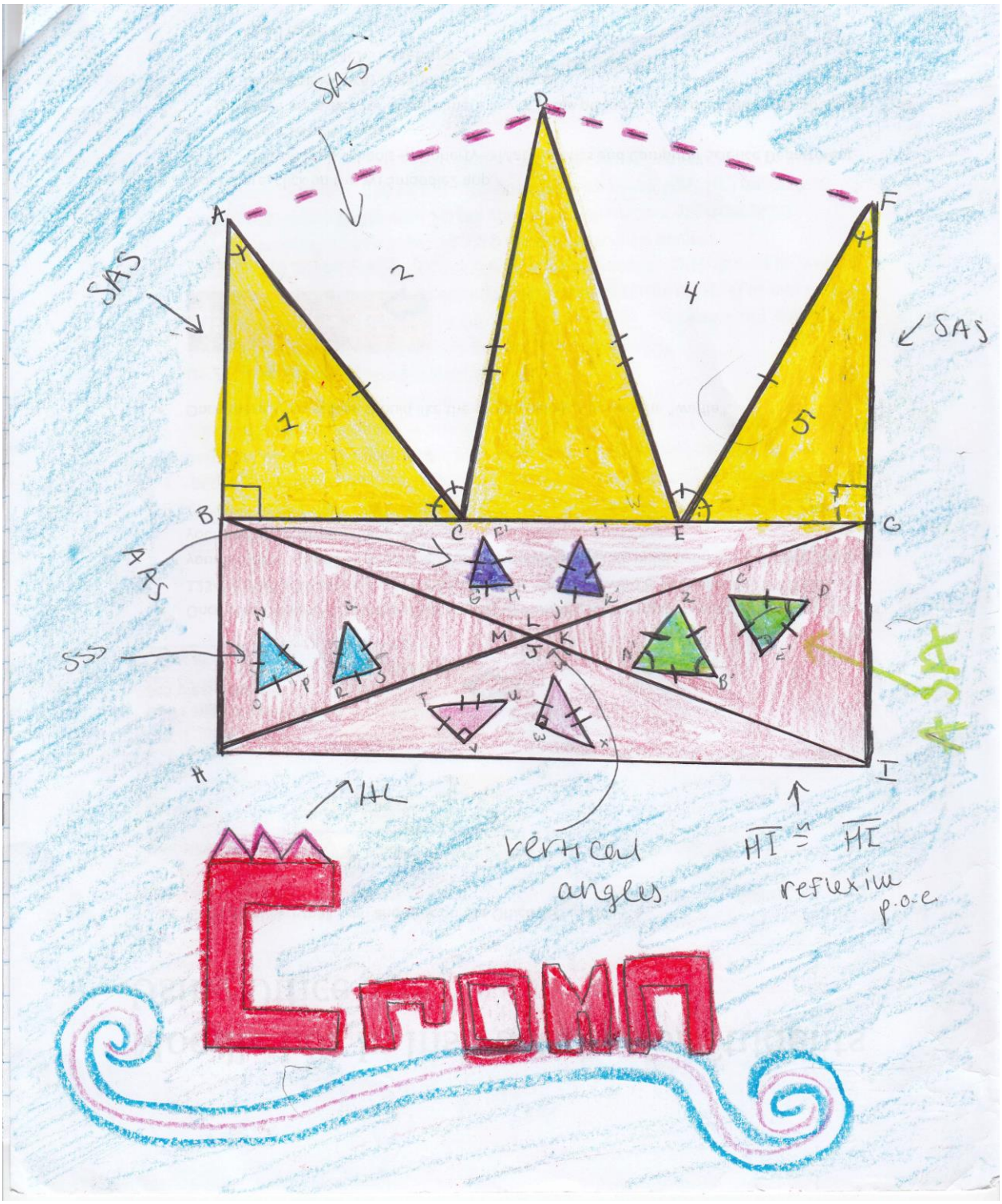
Kite

ASA congruence theorem

Statement	Reason
1. $\angle RQU \cong \angle TQR$ $\angle QUR \cong \angle QUT$	1. Given
2. $\overline{QU} \cong \overline{QU}$	2. Reflexive property
3. $\angle QUT = 90°$ (right angle)	3. Vertical angle
4. $\angle QUR = 90°$ (right angle)	4. Supplementary angles definition
5. $\triangle QUR \cong \triangle QUT$	5. ASA congruence theorem

AAS congruence theorem

Statement	Reason
1. $\angle SRU \cong \angle STU$ $\angle RSU \cong \angle TSU$ $\overline{US} \cong \overline{US}$	1. Given
2. $\triangle RUS \cong \triangle TUS$	2. AAS congruence theorem


SAS
SAS
SAS
SAS
SSS
A SA
HL
vertical angles
HI ≅ HI
reflexive p.o.e
CROWN

Triangle Congruency Project!

need:
- reflexive property
- vertical angles

DUE DATE: November 30th

Instructions:

1. Construct a real life object or a work of art to illustrate your understanding of congruent triangles. **Use all five criterions (SSS, SAS, AAS, ASA, HL) for congruency to make your model.** Label each **vertex** of each triangle with a **different letter.**
   a. You should have **at least 10 triangles** in your final project.
2. Please mark all the congruent triangles for identification. They should be **color coded to showcase one congruency criterion using that one color.** (For instance, the two triangles with ASA criterion could be colored red). The angle and the side measures should be labeled and filled in the attached table.
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3. Examples for this project: a model bridge made of congruent triangles; a decorative window or door in a building; a computer generated graphic design. Be creative!
4. **Write 2-column proofs** for each set of congruent triangles to prove their congruency.
5. Write a **brief reflection** on either of the two topics below. Pick one topic.
   a. How can triangle geometry be applied in everyday life?
   b. Why are proofs (logical reasoning) important? Apply to a non-mathematical situation.
6. Fill out the **table** on the next page with all the information required.

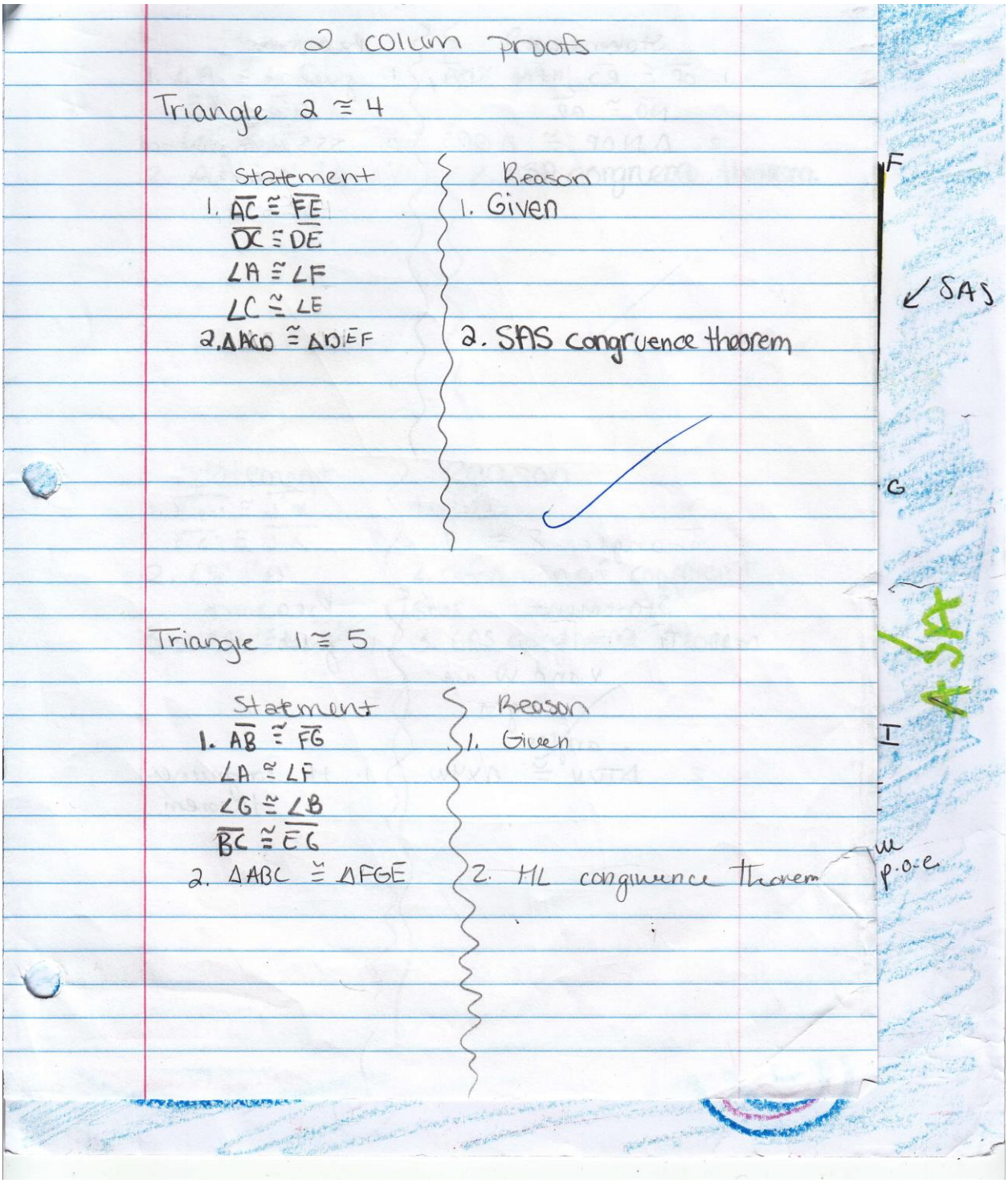
Criteria	Point Value
SSS Proof	10 10
SAS Proof	10 10
AAS Proof	10 10
ASA Proof	10 10
HL Proof	10 7
Neatness	10 10
Creativity	10 10
Reflection	10 5 (not finished?)
Completion of table (not done)	10 3
Directions (labeled vertices? Different colors for different sets of congruent triangles?)	5 ~~0~~ 1 · proofs not labeled · reflexive and vertical ~~angles~~ in proof
Effort ("going the extra mile")	5 5
TOTAL	**100**

~~88~~ 86

+5 for extra proof

beautiful!

Criterion	Part of Drawing	Color of triangles used in model to represent this criterion	Appropriate markings/measurements (Write down side lengths and angle measures to prove congruency)
SSS	Smaller lower triangles	blue	
ASA	lower half of triangle.	green	
SAS	sides of the triangle	yellow	
AAS	lower half.	purple	pur
HL	Bottom of triangle	pink	



2 colum proofs

Triangle 2 ≅ 4

Statement	Reason
1. $\overline{AC} \cong \overline{FE}$	1. Given
$\overline{DC} \cong \overline{DE}$	
$\angle A \cong \angle F$	
$\angle C \cong \angle E$	
2. $\triangle ACD \cong \triangle DEF$	2. SAS congruence theorem

Triangle 1 ≅ 5

Statement	Reason
1. $\overline{AB} \cong \overline{FG}$	1. Given
$\angle A \cong \angle F$	
$\angle G \cong \angle B$	
$\overline{BC} \cong \overline{EG}$	
2. $\triangle ABC \cong \triangle FGE$	2. HL congruence Theorem

F

SAS

G

SA

T

w

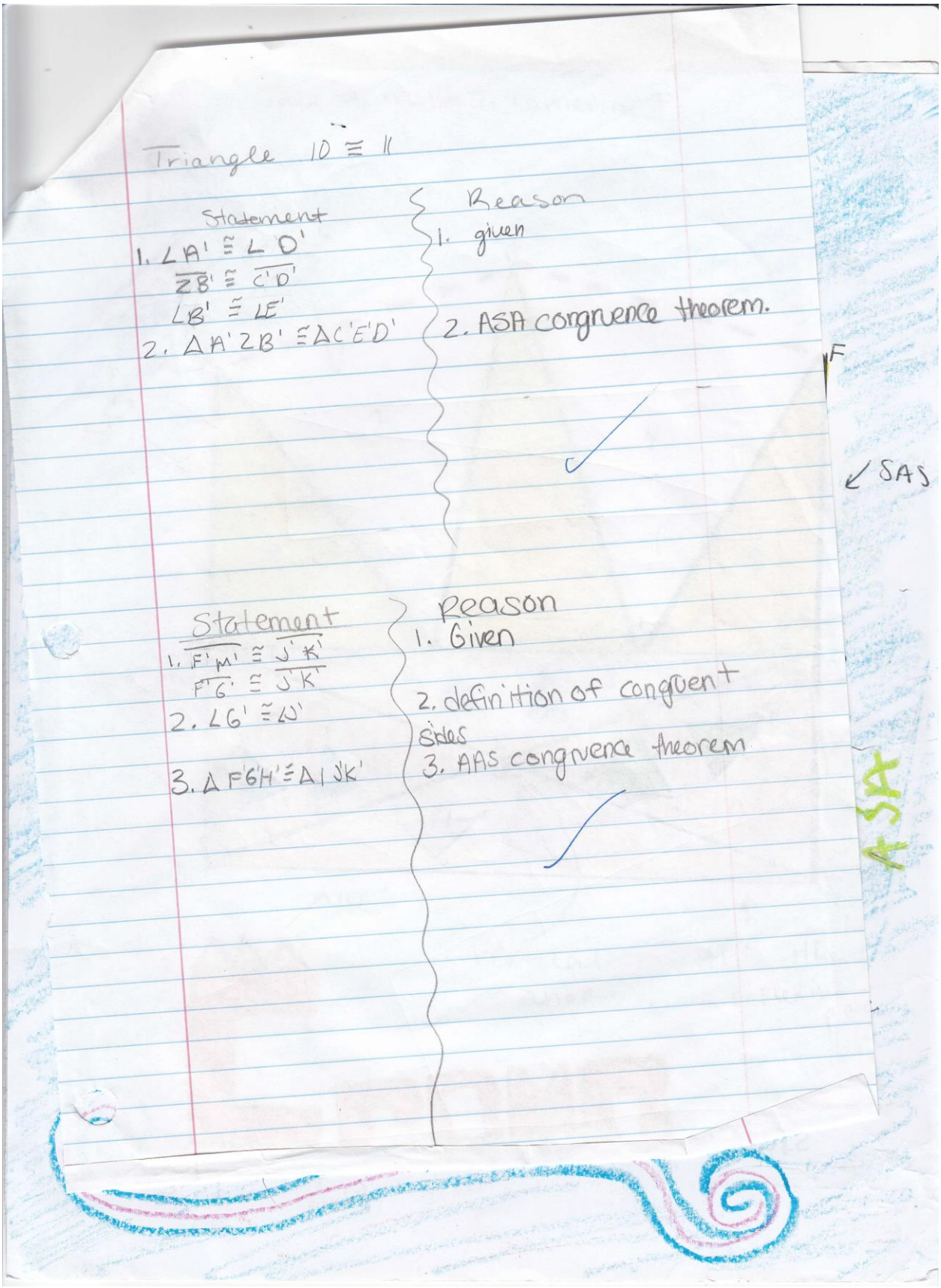
p.o.e

Triangle 6 ≅ 7

Statement	Reason
1. $\overline{OP} \cong \overline{RS}$, $\overline{PN} \cong \overline{SQ}$, $\overline{NO} \cong \overline{QR}$	1. given
2. $\triangle NOP \cong \triangle QRS$	2. SSS congruence theorem

Triangle 8 ≅ 9

Statement	Reason
1. $\overline{TV} \cong \overline{YW}$, V and W are right angles	1. given
2. $\triangle TUV \cong \triangle XYW$	1. HL congruence theorem



Triangle $1D \cong 11$

Statement	Reason
1. $\angle A' \cong \angle D'$, $\overline{ZB'} \cong \overline{C'D'}$, $\angle B' \cong \angle E'$	1. given
2. $\triangle A'ZB' \cong \triangle C'E'D'$	2. ASA congruence theorem.

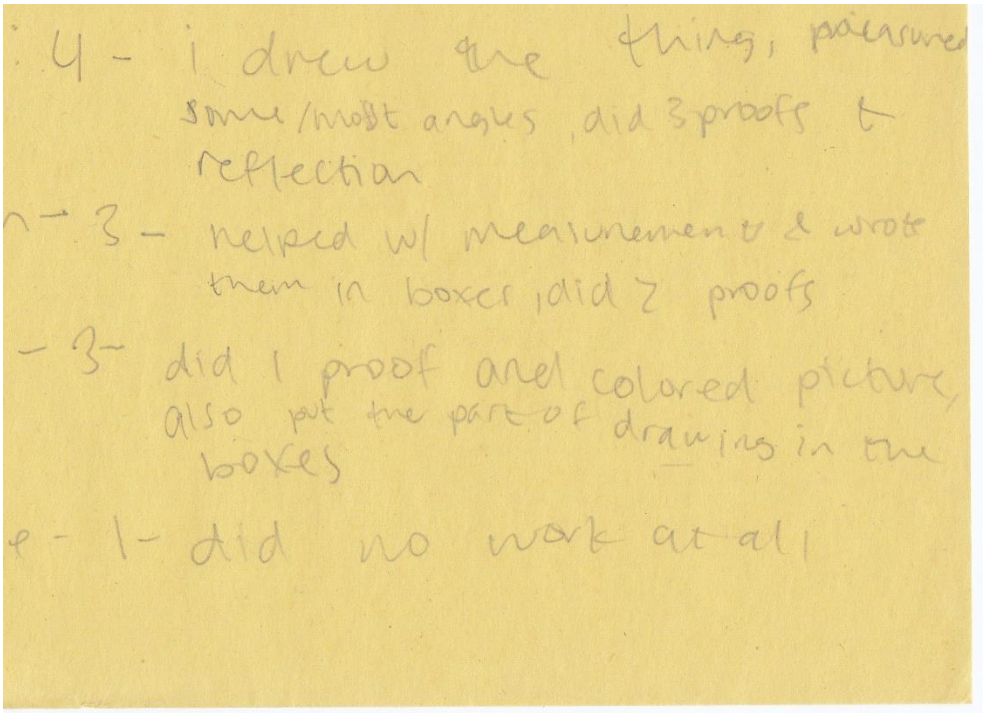
F

SAS

Statement	Reason
1. $\overline{F'M'} \cong \overline{J'K'}$, $\overline{F'G'} \cong \overline{J'K'}$	1. Given
2. $\angle G' \cong \angle J'$	2. definition of congruent sides
3. $\triangle F'G'H' \cong \triangle IJK'$	3. AAS congruence theorem

4 SAS

1.) Proofs are important because they apply to our everday life. In a non-mathematical way, when you are trying to prove a point you need evidence, reasons etc to back up your answer, or opinion. The proofs do just ~~FE~~ this, they

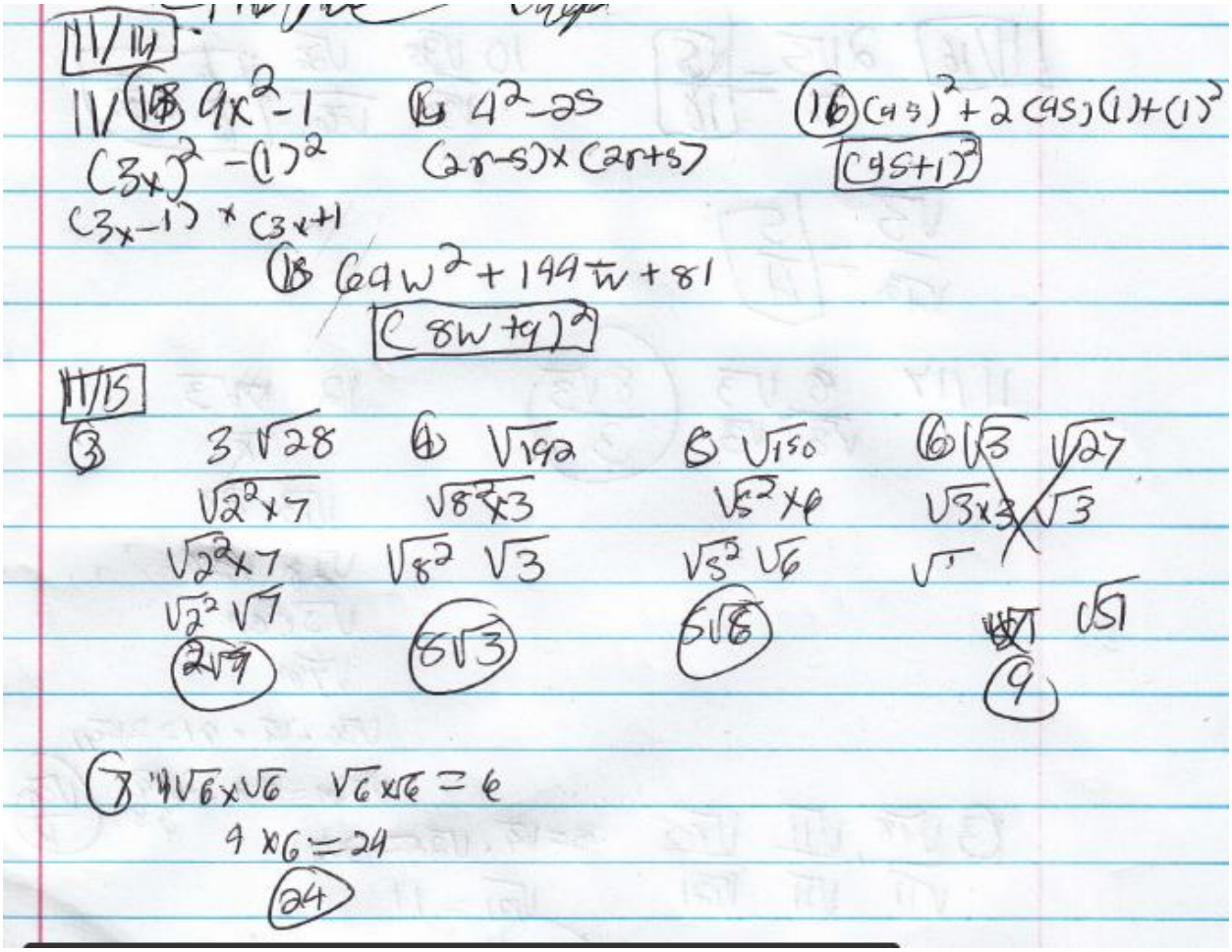

4 - i drew the things, measured some/most angles, did 3 proofs & reflection

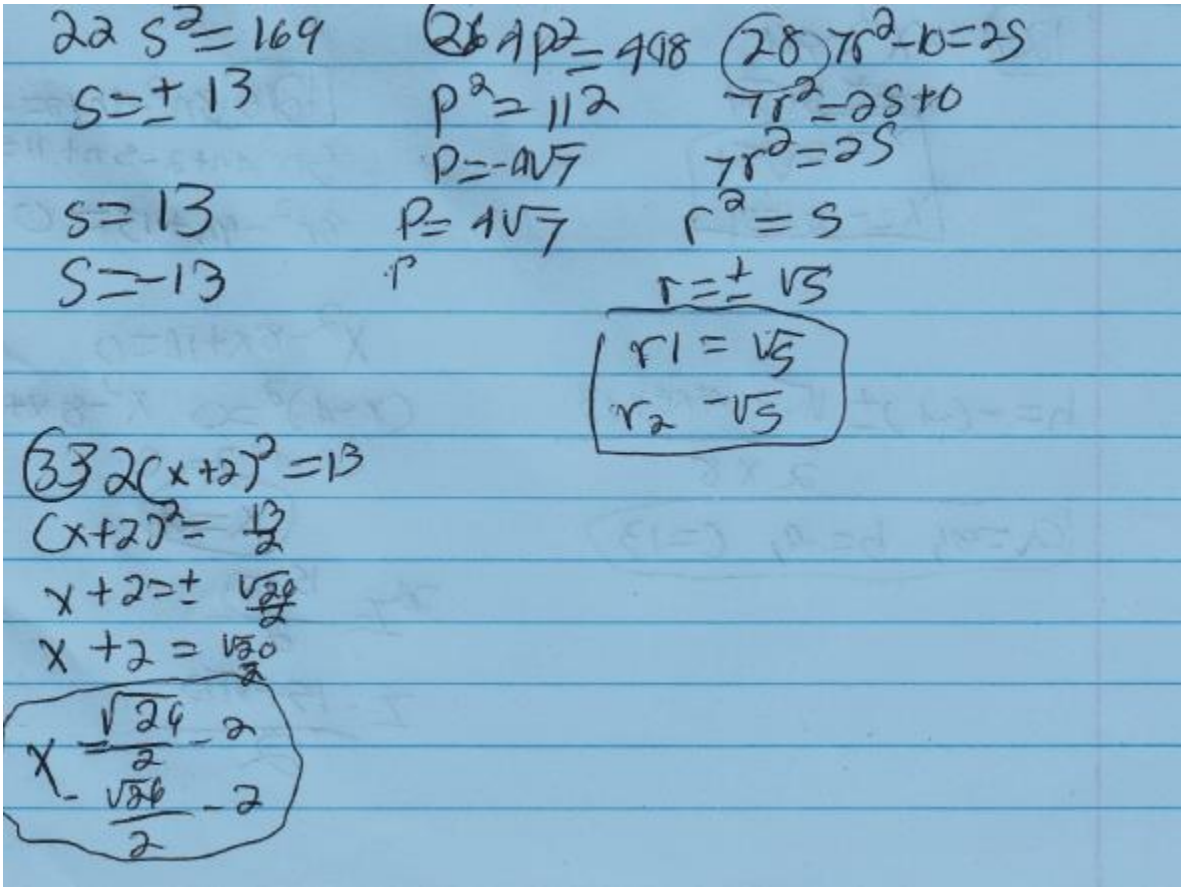
3 - helped w/ measurements & wrote them in boxes, did 2 proofs

2 - did 1 proof and colored picture, also put the parts of drawing in the boxes

1 - did no work at all

Homework/Worksheets





22 $s^2 = 169$

$s = \pm 13$

$s = 13$

$s = -13$

26 $4p^2 = 448$

$p^2 = 112$

$p = -4\sqrt{7}$

$p = 4\sqrt{7}$

r

28 $7r^2 - 0 = 25$

$7r^2 = 25 + 0$

$7r^2 = 25$

$r^2 = 5$

$r = \pm\sqrt{5}$

$r1 = \sqrt{5}$

$r_2 = -\sqrt{5}$

33 $2(x+2)^2 = 13$

$(x+2)^2 = \frac{13}{2}$

$x + 2 = \pm\frac{\sqrt{26}}{2}$

$x + 2 = \frac{\sqrt{26}}{2}$

$x = \frac{\sqrt{26}}{2} - 2$

$x = -\frac{\sqrt{26}}{2} - 2$

11/16 $\frac{2\sqrt{5}}{10} = \frac{\sqrt{5}}{5}$ $\frac{10\sqrt{35}}{\sqrt{36}} \cdot \frac{\sqrt{6}}{\sqrt{6}} = \frac{10}{6}\sqrt{35}$

$\frac{\sqrt{5}}{\sqrt{4^2}} = \frac{5}{4}$

11/17 $\frac{8\sqrt{3}}{\sqrt{3}\times\sqrt{3}}$ $\frac{8\sqrt{3}}{3}$

12 $\frac{7\sqrt{3}}{6}$

$\sqrt{13} \cdot 28$

$\sqrt{28}\ \sqrt{28}$

$\sqrt{5}\ 6\ 4$

$\sqrt{784}$

$\sqrt{36} \cdot \sqrt{4} \cdot 41 = 2\sqrt{41}$

$\sqrt{784} = 28$ $\frac{2\sqrt{41}}{28}$ $\frac{\sqrt{41}}{14}$

13 $\frac{\sqrt{18}}{\sqrt{11}}, \frac{\sqrt{11}}{\sqrt{11}}$ $\frac{\sqrt{198}}{\sqrt{121}}$ $198 = \sqrt{9} \cdot \sqrt{22} = 3\sqrt{21}$

$\sqrt{121} = 11$

$\frac{3\sqrt{22}}{11}$

12) $7 \times x^2 = 84$

$x = \pm 2\sqrt{21}$

$x = 2\sqrt{21}$

$x = -2\sqrt{21}$

11/26 $8n^2 - 4n + 2 = 5n - 11$

$8n^2 - 4n + 2 - 5n + 11 = 0$

$8n^2 - 4n + 13 = 0$

$h = \frac{-(-4) \pm \sqrt{(-4)^2 - 4 \times 8 \times 13}}{2 \times 8}$

$a = 8,\ b = -4,\ c = 13$

$x^2 - 8x + 16 = 0$

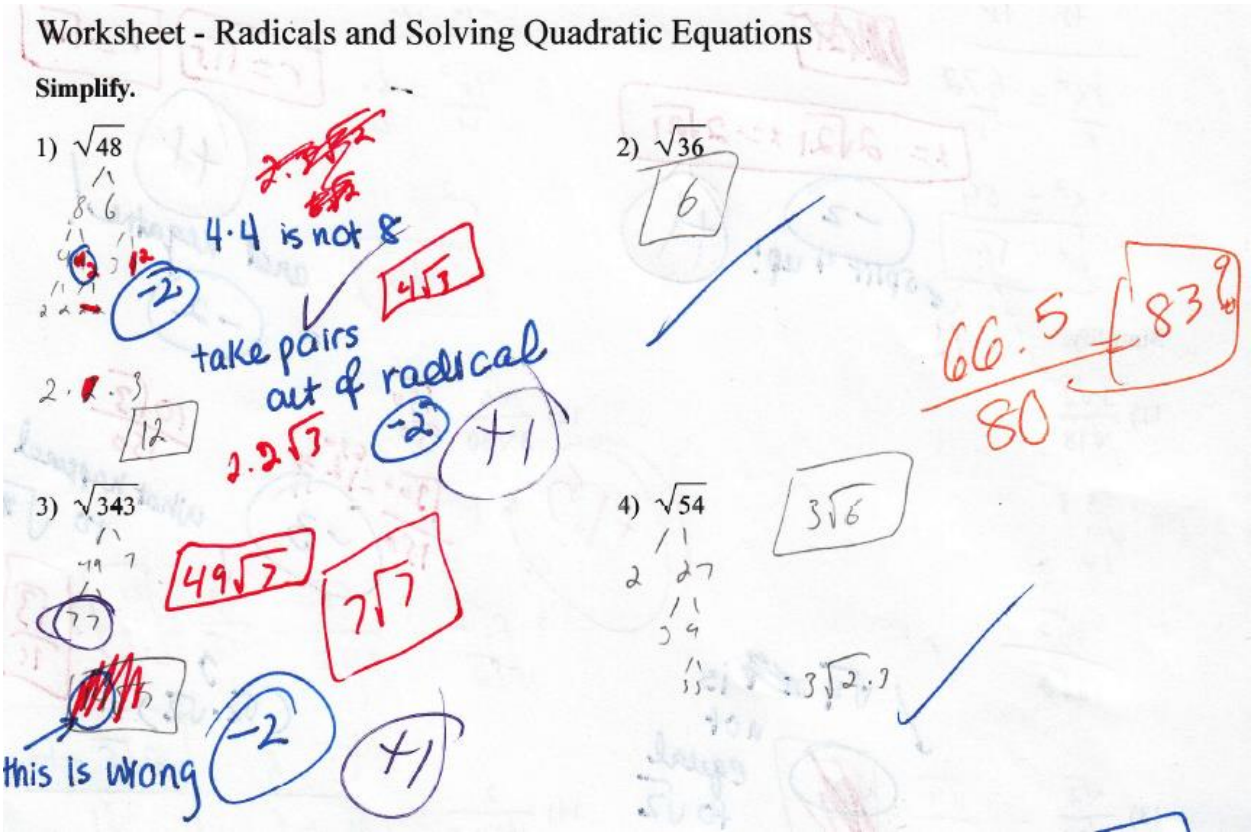
$(x-4)^2 = 0$ $x^2 - 8x + 16 = 0$

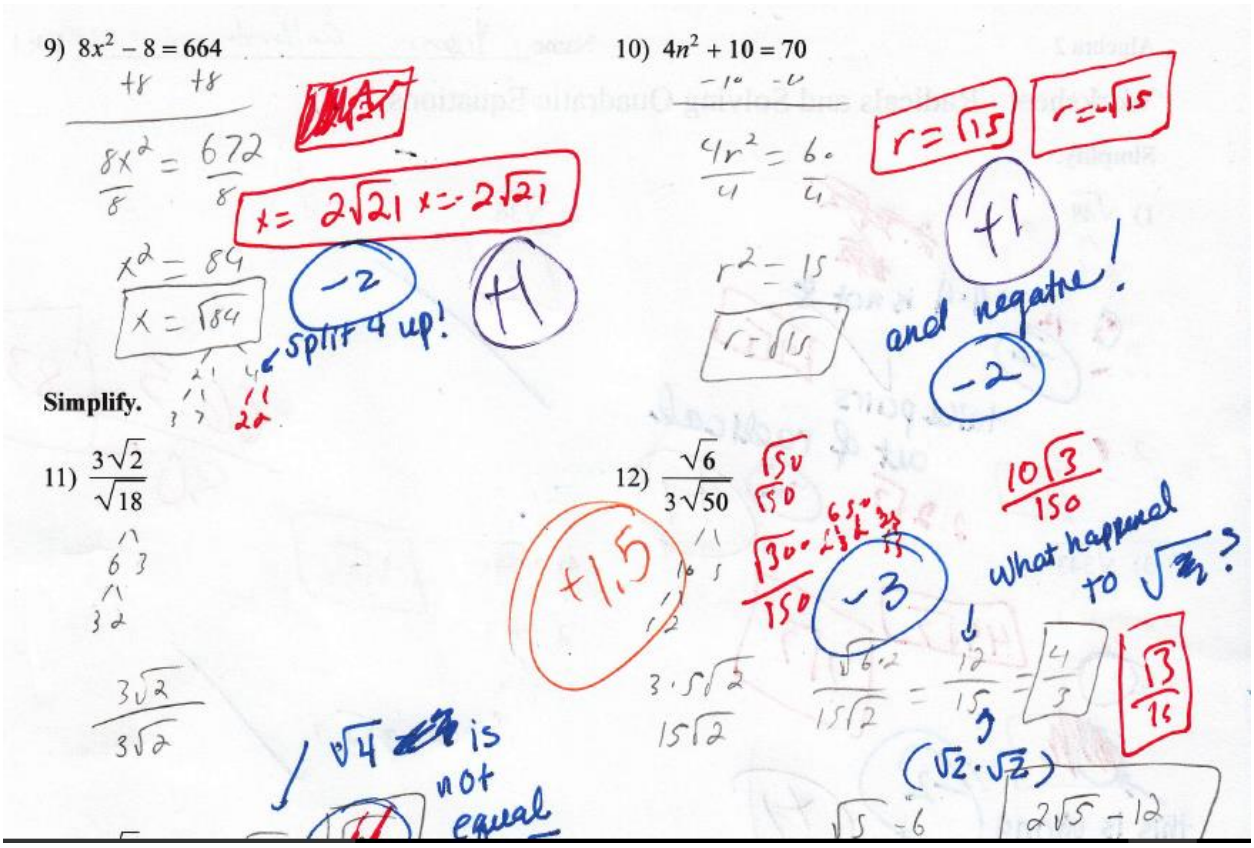
$(x-4)^2 = 0$

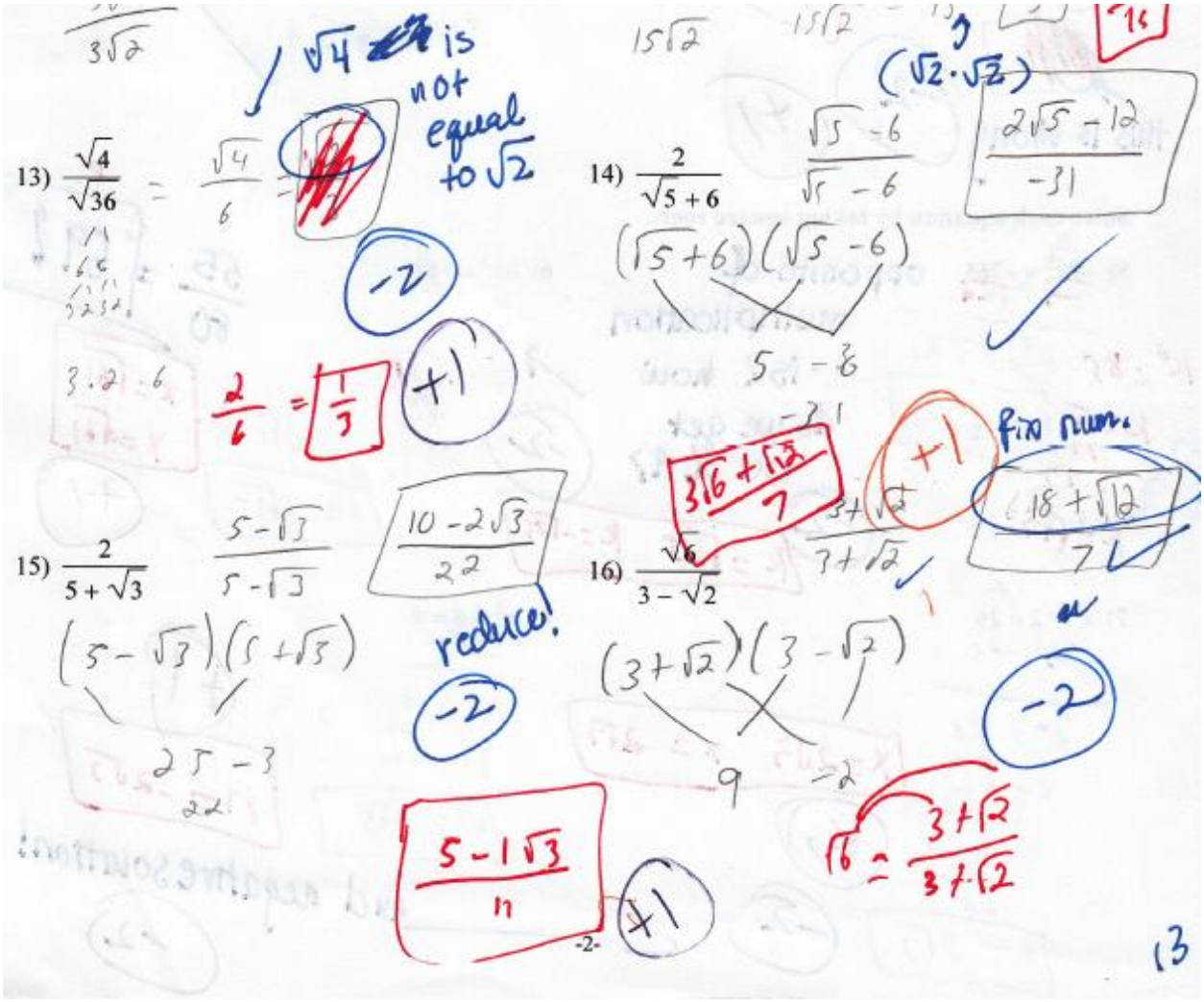
$x = 4$

$z = \frac{15 \cdot \sqrt{13}}{2}$

$z = \frac{15 + \sqrt{13}}{2}$


Worksheet - Radicals and Solving Quadratic Equations
Simplify.
1) √48
4·4 is not 8
take pairs out of radical
2) √36
6
66.5 / 80 ≠ 83%
3) √343
this is wrong
4) √54
3√6
Solve each equation by taking square roots.
5) −9k² = −765
opposite of multiplication is? how do we get rid of 9?
k = ±√85
6) −x² = −61
x = ±√61
55/80 = 69%
7) x² − 2 = 26
x = ±2√7
8) n² − 8 = 4
n = ±2√3
and negative solution!


9) $8x^2 - 8 = 664$
+8 +8
$\frac{8x^2}{8} = \frac{672}{8}$
$x^2 = 84$
$x = \sqrt{84}$
$x = 2\sqrt{21}$ $x = -2\sqrt{21}$
-2
+1
split 4 up!
Simplify.
11) $\frac{3\sqrt{2}}{\sqrt{18}}$
$\frac{3\sqrt{2}}{3\sqrt{2}}$
$\sqrt{4}$ is not equal
10) $4n^2 + 10 = 70$
-10 -10
$\frac{4r^2}{4} = \frac{60}{4}$
$r^2 = 15$
$r = \sqrt{15}$
$r = -\sqrt{15}$
+1
and negative!
-2
12) $\frac{\sqrt{6}}{3\sqrt{50}}$
$\sqrt{50}$
$\sqrt{30} \cdot \frac{\sqrt{5}}{\sqrt{5}}$
$\frac{10\sqrt{3}}{150}$
$\frac{\sqrt{30}}{150}$
+1.5
-3
what happened to $\sqrt{2}$?
$3 \cdot 5\sqrt{2}$
$15\sqrt{2}$
$\frac{\sqrt{6} \cdot 2}{15\sqrt{2}} = \frac{12}{15} = \frac{4}{5}$
$\frac{13}{16}$
$(\sqrt{2} \cdot \sqrt{2})$
$\sqrt{5} - 6$
$2\sqrt{5} - 12$


13) $\frac{\sqrt{4}}{\sqrt{36}}$
$\sqrt{4}$ is not equal to $\sqrt{2}$
$\frac{2}{6} = \frac{1}{3}$
-2
+1
14) $\frac{2}{\sqrt{5}+6}$
$(\sqrt{5}+6)(\sqrt{5}-6)$
$5 - 36$
-31
$\frac{2\sqrt{5}-12}{-31}$
$(\sqrt{2}\cdot\sqrt{2})$
15) $\frac{2}{5+\sqrt{3}}$
$\frac{5-\sqrt{3}}{5-\sqrt{3}}$
$\frac{10-2\sqrt{3}}{22}$
reduce!
$(5-\sqrt{3})(5+\sqrt{3})$
$25-3$
22
-2
$\frac{5-1\sqrt{3}}{11}$
+1
16) $\frac{\sqrt{6}}{3-\sqrt{2}}$
$(3+\sqrt{2})(3-\sqrt{2})$
$9 \quad -2$
$\frac{3\sqrt{6}+\sqrt{12}}{7}$
+1
fix num.
$\frac{18+\sqrt{12}}{7}$
-2
$\sqrt{6} = \frac{3+\sqrt{2}}{3+\sqrt{2}}$
-2-
13

Worksheet - Radicals and Solving Quadratic Equations

Simplify.

1) $\sqrt{48}$ $2 \cdot 2\sqrt{3}$ $4\sqrt{3}$

2) $\sqrt{36}$ $3 \cdot 2 = 6$

3) $\sqrt{343}$ $7\sqrt{7}$

4) $\sqrt{54}$ $3\sqrt{2 \cdot 3}$ $3\sqrt{6}$

62/80 = 78%

56/80 = 70%

Finish

Finish

Solve each equation by taking square roots.

5) $\frac{-9k^2}{-9} = \frac{-765}{-9}$

$\sqrt{k^2} = \pm\sqrt{85}$

$k = \pm\sqrt{85}$ ← not correct

$k = \sqrt{85}$ $k = -\sqrt{85}$ (-2)

6) $-x^2 = -61$

$\sqrt{x^2} = \sqrt{\pm 61}$ how did you get 63?

$x = \pm\sqrt{61}$ (-2)

$x = \sqrt{61}$ $x = -\sqrt{61}$

7) $x^2 - 2 = 26$

$+2 \quad +2$

$\sqrt{x^2} = \pm\sqrt{28}$ 26 + 2 is not 27!

$x = \pm 2\sqrt{7}$ (-2)

$x = 2\sqrt{7}$ $x = -2\sqrt{7}$ (+1)

8) $n^2 - 8 = 4$

$-4 \quad -4$

$\sqrt{n^2} = \pm\sqrt{12}$ $\sqrt{12}$ is not 6!

$n = \pm 2\sqrt{3}$ (-2)

$n = 2\sqrt{3}$ $n = -2\sqrt{3}$ (+1)

9) $8x^2 - 8 = 664$
$+8 \quad +8$
$\frac{8x^2}{8} = \pm\frac{672}{8}$
$\sqrt{x^2} = \pm\sqrt{84}$
make the tree
84
-2

10) $4n^2 + 10 = 70$
$-10 \quad -10$
$\frac{4n^2}{4} = \pm\frac{60}{4}$
$\sqrt{n^2} = \pm\sqrt{15}$
3.8 is not 15
$n = \pm\sqrt{15}$
-2
$n = \sqrt{15} \quad n = -\sqrt{15}$
+1

Simplify.

11) $\frac{3\sqrt{2}}{\sqrt{18}} \cdot \frac{\sqrt{18}}{\sqrt{18}} = \frac{3\sqrt{36}}{18} = \frac{18}{18} = 1$
this was good!
Keep going!
+1
-2

12) $\frac{\sqrt{6}}{3\sqrt{50}}$
-2
only need $\frac{\sqrt{50}}{\sqrt{50}}$

13) $\frac{\sqrt{4}}{\sqrt{36}} = \frac{\sqrt{2}\sqrt{2}}{\sqrt{6}\sqrt{6}} = \frac{2}{6} = \frac{1}{3}$
reduced.
close!
no need for $\sqrt{}$
-2
+1

14) $\frac{2}{\sqrt{5}+6}$
good
just change the sign
try again
-2

15) $\frac{2}{5+\sqrt{3}} \cdot \frac{5-\sqrt{3}}{5-\sqrt{3}}$ good!
good → $\frac{10-2\sqrt{3}}{25-3} = \frac{10-2\sqrt{3}}{22} = \frac{5-\sqrt{3}}{11}$
X wrong -2
+1

16) $\frac{\sqrt{6}}{3-\sqrt{2}} \cdot \frac{3+\sqrt{2}}{3+\sqrt{2}}$ good
$\frac{18+6\cdot 8}{9+3\sqrt{2}} = \frac{18+12}{12\sqrt{3}} = \frac{30}{12\sqrt{3}}$
X wrong
-2

Quizzes

6.1-6.2 Quiz

Simplify the ratios below:

1. 68 mL / 42 mL

   $\frac{68\text{ mL}}{42\text{ mL}} = \frac{34}{21}$

2. \$75 / \$25

   $\frac{\$75}{\$25} = \frac{3}{1}$

3. 8 ft / 4 in.

   $\frac{8\text{ ft}}{4\text{ in}} = \frac{96\text{ in}}{4\text{ in}} = \frac{24}{1}$

4. 300 cm. / 5 m

   $\frac{300\text{ cm}}{5\text{ m}} = \frac{300\text{ cm}}{500\text{ cm}} = \frac{3}{5}$

Solve for the variable in the proportions below:

Leave your answers as fractions if necessary

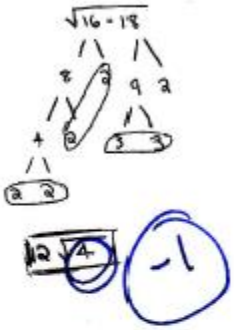
5. $\frac{10}{2} \times \frac{5}{a}$

   $10a = 10$

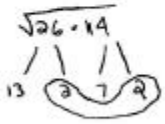
   $a = 1$

Solve for the geometric mean below:

9. 16 and 18



10. 26 and 14



2√90 -1

45 = 90%

6. $\frac{3}{v-10} \times \frac{2}{10}$

$30 = 2v - 20$

$50 = 2v$

$25 = v$

7. $\frac{n-9}{7n} \times \frac{5}{8}$

$35n = 8n - 72$

$27n = -72$

$n = -72/27$

reduce! (-1)

8. $\frac{r+2}{9} \times \frac{r-6}{4}$

$4r + 8 = 9r - 54$

$8 = 5r - 54$

$62 = 5r$

$62/5 = r$

30

11. The measures of the angles in triangle RST are in the extended ratio 2:3:4. Find the measures of the angles.

a. Angle R = 40°

b. Angle S = 60°

c. Angle T = 80°

$2x + 3x + 4x = 180$

$9x = 180$

$x = 20$

Name:_____ Date:_____ Period:___

12. You are building a fence in your backyard to keep your dog from escaping. The perimeter of your fence is 96 feet. The ratio of the length to the width is 6:2.

a. Find the length and the width in feet.

$2(6x) + 2(2x) = 96$

$12x + 4x = 96$

$16x = 96$

$x = 6$

$l = 36$ ft

$w = 12$ ft

b. If the cost of a fence is $3 per foot, how much will you spend on the fence in total? Create a **proportion** and solve. 144 ft

$\frac{36}{3x} \times \frac{12}{3x}$ $\frac{36}{12} \times \frac{3}{1}$

$36x = 96$

$\frac{3x}{x} \times \frac{6}{2}$ $\frac{6}{2} \times \frac{96}{x}$

$6x = 96$

$6x = 36$

$\frac{6}{12} \frac{3}{x}$

$6x = 36$

$x = 6$

14. **A blueprint shows the scale drawing of a house. The length of one living room wall on the blueprint is 4 inches. The actual length of the wall is 10 feet. What is the scale of the blueprint?**

4 in → 10 ft (120 in)

× 30

1 in → 2.5 ft

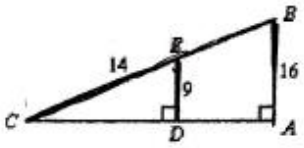
$\frac{4 \text{ in}}{1 \text{ in}} = \frac{10 \text{ ft}}{2.5 \text{ ft}}$

15. The scale of a map is 25 miles: 1 inch. If the distance between Boston and Worcester is 45 miles, what is the distance in inches on the map?

$\frac{25 \text{ m}}{1 \text{ in}} = \frac{45 \text{ m}}{1.8 \text{ in}}$

13.

Given that $\frac{ED}{BA} = \frac{EC}{BC}$, find BC to the nearest tenth.
The figure is not drawn to scale.



$\frac{9}{16} \times \frac{14}{x}$

$9x = 224$

$x = 24.888888889$

$BC = \boxed{24.9}$

Use the properties we learned in class to fill in the blanks below:

16. If $\frac{6}{x} = \frac{5}{y}$, then $\frac{6}{5} = -\frac{x}{y}$

17. If $\frac{x}{4} = \frac{7}{y}$, then $\frac{x+4}{4} = -\frac{7+x}{y}$

18. If $\frac{z}{x} = \frac{y}{c}$, then $\frac{c}{y} = -\frac{x}{z}$

Quiz - 4.8: Use the Quadratic Formula and Discriminant

Find the discriminant of each quadratic equation then state the number and type of solutions.

1) $3a^2 - 2a + 2 = 0$

$a=3$ $b=-2$ $c=2$

$-2^2 - 4(3 \cdot 2)$

$4 - 4(6)$

$4 - 24$

-20

↓

2 imaginary solutions

2) $-3p^2 - 2p - 8 = -5$

$+5 \quad +5$

$-3p^2 - 2p - 3 = 0$

$a=-3$ $b=-2$ $c=-3$

$-2^2 - 4(-3 \cdot -3)$

$4 - 4(9)$

$4 - 36$

-32

↓

2 imaginary solutions

3) $3n^2 = -3 - 6n$

$3n^2 + 6n + 3 = 0$

$a=3$ $b=6$ $c=3$

$6^2 - 4(3 \cdot 3)$

$36 - 4(9)$

$36 - 36$

0

↓

one real solution

4) $-2x^2 = 5x$

$-5x \quad -5x$

$-2x^2 - 5x + 0 = 0$

$a=-2$ $b=-5$ $c=0$

$-5^2 - 4(-2 \cdot 0)$

$25 - 4 \quad 0 \cdot 4 = 0$

21

-2

↓

Two real solutions

Solve each equation with the quadratic formula.

5) $6k^2 = -4k + 1$

$+4k \quad -1$

$6k^2 + 4k - 1$

$a = 6$
$b = 4$
$c = -1$

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

$$x = \frac{-4 \pm \sqrt{16 - 24}}{12}$$

$$x = \frac{-4 \pm \sqrt{-8}}{12}$$

$$x = \frac{-4 \pm 2i\sqrt{2}}{12}$$

$$\boxed{x = \frac{-2 \pm i\sqrt{2}}{6}}$$

$\sqrt{-8}$

$\sqrt{-1}\sqrt{8}$

$4 \cdot 2$

$2 \cdot 2$

$2i\sqrt{2}$

6) $8p^2 + 4p = -4$

$+4 \quad +4$

$8p^2 + 4p + 4 = 0$

$a = 8$
$b = 4$
$c = 4$

$$x = \frac{-4 \pm \sqrt{4^2 - 4(8)(4)}}{2(8)}$$

$$x = \frac{-4 \pm \sqrt{16 - 128}}{16}$$

$$x = \frac{-4 \pm \sqrt{-112}}{16}$$

$$x = \frac{-4 \pm 4i\sqrt{7}}{16} \quad \div 4$$

$$\boxed{x = \frac{-1 \pm i\sqrt{7}}{4}}$$

$\sqrt{-112}$

$\sqrt{-1}\sqrt{112}$

$2 \cdot 56$

$7 \cdot 8$

$4 \cdot 2$

$2 \cdot 2$

$4\sqrt{7}$

Quiz - Factoring when a=1

Solve each equation by factoring.

1) $x^2 - 3x - 10 = 0$

$c = -10$

$c: -10$	$b: ?$
$-11, 10$	9
$2, -5$	-3

$(x+2) = 0 \quad (x-5) = 0$

$x = -2 \quad x = 5$

2) $x^2 - 9x + 20 = 0$

$c: 20$

$c: 20$	$b: -9$
$1, 20$	21
$2, 10$	12
$-4, -5$	9
$-4, -5$	9

$(x-4) = 0 \quad (x-5) = 0$

$x = 4 \quad x = 5$

3) $b^2 + 3b - 40 = 0$

$c = -40$

$c: -40$	$b: 3$
$-1, 40$	41
$-2, 20$	18
$-4, 10$	6
$-5, 8$	3

$(x-5) = 0 \quad (x+8) = 0$

$x = 5 \quad x = -8$

4) $v^2 - 2v - 15 = 0$

$c = -15$

$c: -15$	$b: 2$
$-1, 15$	14
$-3, 5$	2
$-5, 3$	-2

$(x-5) = 0 \quad (x+3) = 0$

$x = 5 \quad x = -3$

$\frac{65}{75} = 86.67\%$

5) $2n^2 - 12n + 18 = 0$

$2(n^2 - 6n + 9) = 0$

$c: 9$

$c: 9$	$b: -6$
$1, 9$	8
$-3, 3$	0
$-1, -9$	-8

$(x-3) = 0 \quad (x-3) = 0$

$x = 3 \quad x = 3$

6) $4n^2 + 16n + 12 = 0$

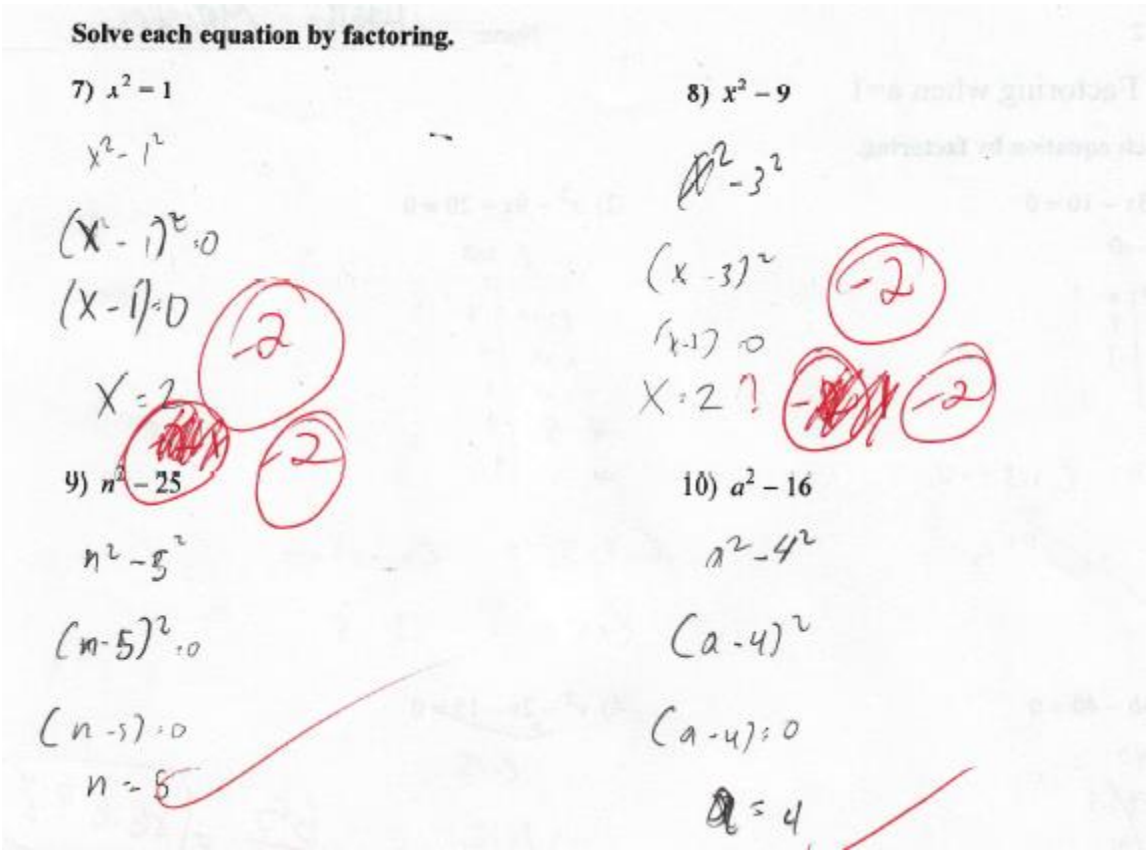
$4(n^2 + 4n + 3) = 0$

$c: 3$

$c: 3$	$b: 4$
$1, 3$	4

$(x+1) = 0 \quad (x+3)$

$x = -1 \quad x = -3$



Solve each equation by factoring.

7) $x^2 = 1$

$x^2 - 1^2$

$(x - 1)^2 = 0$

$(x - 1) = 0$

$x = 1$

-2

-2

8) $x^2 - 9$

$x^2 - 3^2$

$(x - 3)^2$

$(x - 3) = 0$

$x = 3$

-2

-2

9) $n^2 - 25$

$n^2 - 5^2$

$(n - 5)^2 = 0$

$(n - 5) = 0$

$n = 5$

10) $a^2 - 16$

$a^2 - 4^2$

$(a - 4)^2$

$(a - 4) = 0$

$a = 4$

Solve each equation by factoring.

11) $x^2 + 6x + 9$

c: 9	b: 6
1, 9	10
3, 3	6

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

$x=-3$ $x=-3$

12) $r^2 + 4r + 4$

c: 4	b: 4
1, 4	5
2, 2	4 ✓

$(r+2)=0$ $(r+2)=0$

$r=-2$ $r=-2$

13) $k^2 + 8k + 16$

c: 16	SF 8
1, 16	17
2, 8	10
4, 4	8 ✓

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

$x=-4$ $x=-4$

14) $m^2 - 2m + 1$

c: 1	b: -2
1, 1	2
-1, -1	-2 ✓

$(x-1)=0$ $(x-1)=0$

$x=1$ $x=1$

15) $x^2 + 3x - 12 = 0$

c: -12	SF 3
-6, 2	-4
-2, 6	4
-3, 4	1

answer? -2

Unit Test

Unit 2 Test

1) If the conditional statement is true, what statement is automatically true?

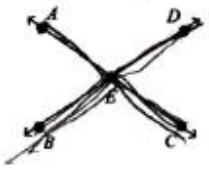
a) converse

b) inverse

c) contrapositive

d) biconditional

2. In the figure shown, $m\angle AED = 124°$. Which of the following statements is false?



a. $\angle BEC$ and $\angle CED$ are adjacent angles.
b. $\angle AEB$ and $\angle DEC$ are supplementary angles.
c. $m\angle AEB = 56°$
d. $m\angle BEC = 124°$

3. Solve for x.

4. Give the reason for the last statement in the proof.

Statement	Reason
$\angle 1$ is a supplement of $\angle 2$.	Given
$\angle 3$ is a supplement of $\angle 4$.	Given
$\angle 2 \cong \angle 4$	Given
$\angle 1 \cong \angle 3$	?

a. Congruent Supplements Theorem
b. Congruent Complements Theorem
c. Vertical Angles Congruence Theorem
d. Linear Pair Postulate

5. Give the reason for the last statement in the proof.

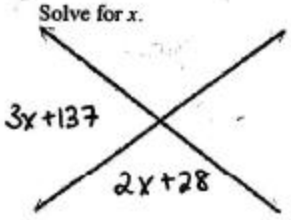
Statement	Reason
$\angle 1$ and $\angle 2$ are vertical angles.	Given
$\angle 1 \cong \angle 2$	?

a. Vertical Angles Congruence Theorem
b. Congruent Complements Theorem
c. Congruent Supplements Theorem
d. Linear Pair Postulate

6. $\angle 1$ and $\angle 2$ form a linear pair. If $m\angle 2 = 67°$, what is $m\angle 1$?

a. 23°
b. 33°
c. 113°
d. 67°

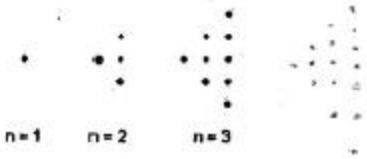
3 Solve for x.



a. 3
b. 6
c. 1
d. 2

d. 67°

7. The first three members of a sequence are shown. How many dots are in the fourth member of the sequence?



a. 30
b. 16
c. 14
d. 7

8. Refer to the following statement: Two lines are perpendicular if and only if they intersect to form a right angle.
a. Is this a biconditional statement?
b. Is the statement true?

1

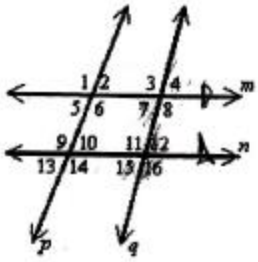
Name: _____ ID: A

Choose the phrase that completes the following statement as stated by the Point, Line, and Plane Postulates:

9. One plane ____ passes through three noncollinear points.
   a. always
   b. never
   c. sometimes
   d. Point, Line, and Plane Postulates do not address this topic directly.

10. A line ____ contains at least two points.
   a. always
   b. never
   c. sometimes

11. Line m is parallel to line n and they are each intersected by the same two transversals. Which angle is NOT necessarily congruent to $\angle 4$?



   a. $\angle 12$
   b. $\angle 16$
   c. $\angle 7$
   d. $\angle 15$

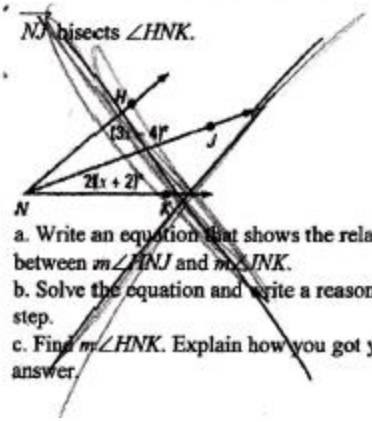
12. Identify the property of congruence.
If $\angle Q \cong \angle R$, then $\angle R \cong \angle Q$.
   a. Symmetric Property of Congruence
   b. Substitution Property
   c. Transitive Property of Congruence
   d. Reflexive Property of Congruence

13. Skew lines ____ intersect in exactly one point.
   a. Point, Line, and Plane Postulates do not address this topic directly.
   b. never
   c. sometimes
   d. always

14. Which of the following is an example of the Transitive Property?
   a. If $y = x - 4$, then $x - 4 = y$.
   b. $x - 3 = x - 3$
   c. If $x = -3$, then $x - 4 = -3 - 4$.
   d. If $x - 3 = y$ and $y = -4$, then $x - 3 = -4$.

15. If $PQ = 3$ and $PQ + RS = 5$, then $3 + RS = 5$ is an example of the _____.
   a. Substitution Property of Equality
   b. Multiplication Property of Equality
   c. Transitive Property of Equality
   d. Reflexive Property of Equality

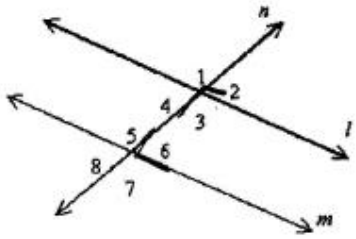
16. $\overrightarrow{NJ}$ bisects $\angle HNK$.



a. Write an equation that shows the relationship between $m\angle HNJ$ and $m\angle JNK$.
b. Solve the equation and write a reason for each step.
c. Find $m\angle HNK$. Explain how you got your answer.

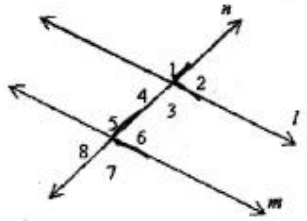
Name: _____ ID: A

17. In the figure, ∠6 and ∠3 are _____.



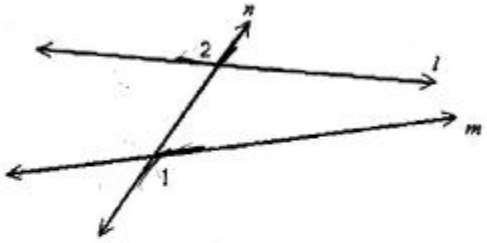
a. alternate exterior angles
b. consecutive interior angles
c. corresponding angles
d. alternate interior angles

18. In the figure, ∠6 and ∠2 are _____.



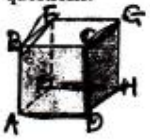
a. alternate interior angles
b. consecutive interior angles
c. alternate exterior angles
d. corresponding angles

19. In the figure, ∠1 and ∠2 are _____.



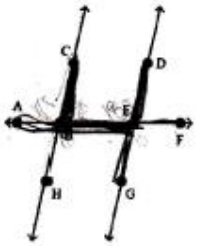
a. alternate exterior angles
b. alternate interior angles
c. consecutive interior angles
d. corresponding angles

20. Use the cube below to answer the following questions.



a) What is the relationship between lines BF and EH?
b) What is the relationship between lines HD and CG?
c) What is the relationship between lines AD and CD?

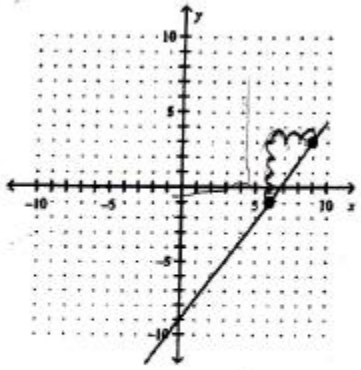
21. In the figure shown, $\overleftrightarrow{HC} \parallel \overleftrightarrow{GD}$ and $m\angle ABC = 100°$. Which of the following statements is false?



a. $m\angle CBE = 80°$
b. $m\angle DEF = 80°$
c. $\angle DEB$ and $\angle CBE$ are corresponding angles.
d. $\angle CBE$ and $\angle GEB$ are alternate interior angles.

Name: _____ ID: A

22. Find the slope of the line.



a. $\frac{2}{15}$

b. $\frac{15}{2}$

c. $\frac{3}{4}$

d. $\frac{4}{3}$

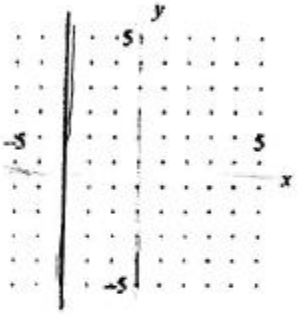
23. Which best describes the relationship between the line that passes through (7, 1) and (10, 5) and the line that passes through (–8, 5) and (–5, 9)?

a. perpendicular

b. neither perpendicular nor parallel

c. parallel

24. Determine the slope of the line graphed below.



a. 0

b. $-\frac{1}{3}$

c. undefined

d. -3

Find the slope of the line that contains (2, 4) and (4, 4).

a. $\frac{1}{3}$

a. $-\frac{1}{3}$

b. undefined

c. 0

d. 4

25. Write an equation that is parallel to $y = \frac{1}{2}x + 3$ and passes through (0, 0).

a. $y = \frac{1}{2}x + 6$

b. $y = \frac{1}{2}x - 3$

c. $y = \frac{1}{2}x$

d. $y = 2x$

26. Which best describes the relationship between the lines with equations $-5x - 8y = 4$ and $-30x - 48y = 24$?

a. neither parallel nor perpendicular

b. same line

c. parallel

d. perpendicular

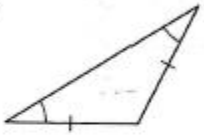
Geometry

UNIT 2 TEST

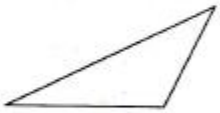
Classify each triangle by its angles and sides. Equal sides and equal angles, if any, are indicated in each diagram.

1)

2)



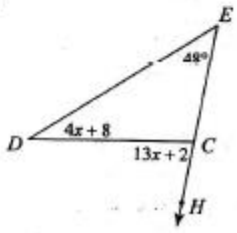
3)



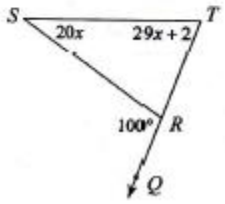
4)

Solve for x.

5)

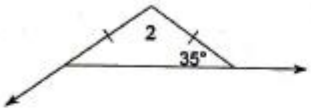


6)

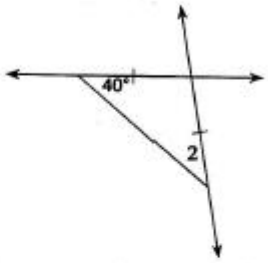


Find the value of x.

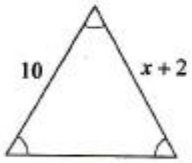
7) $m\angle 2 = 11x + 11$



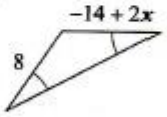
8) $m\angle 2 = x + 52$



9)



10)



5

1) C
2) C -1
3) -1
4) A
5) B -1
6) C
7) B -1
8) A) It is biconditional system
B) The statement is true
9) C -1
10) A
11) d -1
12) d -1
13) d -1
14) C -1
15) C -1
17) B
18) d
19) A
20) A - Skew
B - -1
C - -1
21) d -1
22) d
23) D -1
24) C
25) b -1
26) A -1
#1) Regular
2) -2
3) Not triangle -2
4) -2
5) $4x+8+48 = 13x+2$
$4x+56 = 13x+2$
$-13x \quad -56 \quad -13x \quad -56$
$-9x = -54$
$x = 6$
6) $20x + 29x + 2 = 100$
$49x + 2 = 100$
$-2 \quad -2$
$\frac{49x}{49} = \frac{98}{49}$
$x = 2$

3

$23/48 =$

47.926

7) $11x + 11 + 35 = 180$

$11x + 46 = 180$

$-46 \quad -46$

$\frac{11x}{11} = \frac{134}{11}$

$x = 12.$ (-1)

8) $x + 52 + 40 = 180$

$x + 92 = 180$ (-2)

$-92 \quad -92$

$x = 178$

9) $10 = x + 2$

$-2 \quad -2$

$8 = x$

10) $8 = -14 + 2x$

$+14 \quad +14$

$\frac{22}{2} = \frac{2x}{2}$

10) $8 = -14 + 2x$

$+14 \quad +14$

$\frac{22}{2} = \frac{2x}{2}$

$11 = x$

Appendix C: Lesson Plans

First Lesson Plans

Lesson Plan - Measure and Classify Angles

Goals:

- Identifying an angle
- Classifying angles
    - Acute
    - Right
    - Obtuse
    - Straight
- Angle addition postulate
- Briefly showing notation for congruent angles and identification
- Bisect - creates congruent angles

Structure:

- Do Now - 2 minutes
- Go over Do Now - Identifying an angle
    - Definition - 2 different rays with the same endpoint
        - Endpoint - vertex
        - Rays - sides
    - Draw a few example angles to show how they can be named and how they cannot (e.g. vertex has to be the center letter)
- Classifying Angles
    - Define and draw examples of
        - Acute - 0-90
        - Right - 90
        - Obtuse- 90-180
        - Straight - 180
    - 1-16 on worksheet - can work with the person next to them
- Angle addition postulate
    - Angles inside a larger angle add up to the larger angle - show an example
    - 17-24 on worksheet - work alone
- Congruent angles
    - Go over notation (double curves v. single) to show which angles are congruent
    - Go over notation = with ~ for congruency
    - Example 4 p. 27 - work alone
- Bisecting angles
    - Angle bisector - ray that divides an angle into two angles that are congruent
    - Example 5 p. 28 - work with the person next to them

HW: p. 29 7-10, 15-20, 25,26, 33-38, 41, 49

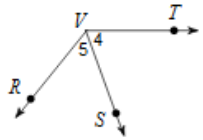
Geometry Name_____ ID: 1

Do Now - Angles

Date_____ Period____

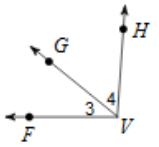
Name all the angles that have *V* as a vertex.

1)



A) ∠4, ∠5, ∠*RST*
B) ∠4, ∠5, ∠*VRS*
C) ∠4, ∠5, ∠*STV*
D) ∠4, ∠5, ∠*TVR*

2)



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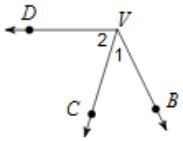
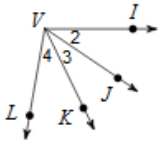


A) ∠1, ∠2, ∠*CBV*
B) ∠1, ∠2, ∠*VDC*
C) ∠1, ∠2, ∠*DCB*
D) ∠1, ∠2, ∠*BVD*

4)



Lesson Plan 2 - Describe Angle Pair Relationships

Goals:

- Complementary v. supplementary
- Adjacent angles
- Linear pair - supplementary angles
- Vertical angles (congruent)

Structure:

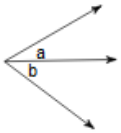
- Do Now
    - On piece of paper - project to class
    - Go over any questions
- Complementary (90) v. supplementary (180)
    - Draw examples of each
        - Draw some that are adjacent and some that are not or project the figure before Example 1
    - Go over tricks to remember them
        - Drawing lines through the words to get the numbers 90 and 180
        - C comes before S in the alphabet, 90 is smaller than 180
- Adjacent angles
    - Angles that are next to each other
    - Definition: two angles that share a common vertex and side, but have no common interior points
- Linear pair
    - Supplementary angles
    - Definition: Adjacent angles are a linear pair if their noncommon sides are opposite rays
    - Draw an example
- Vertical Angles
    - Definition: Sides form 2 pairs of opposite rays
    - Draw an example
        - Prove using supplementary angles that opposite angles are equal
- Worksheet in group
    - Project answers to homework so they can check themselves
- Homework: Worksheet, p. 38 3-5, p. 39 20-27, 32-33

Geometry Name_____ ID: 1

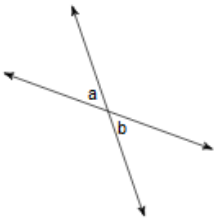
Angles Date_____ Period____

Name the relationship: complementary, linear pair, vertical, or adjacent.

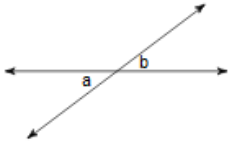
1)



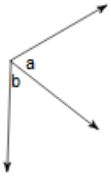
2)



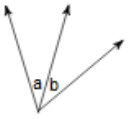
3)



4)

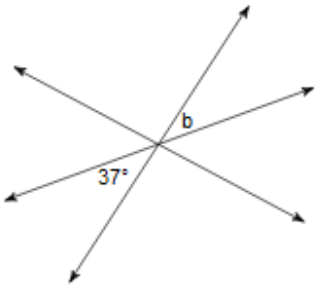


5)



Find the measure of angle b.

6)



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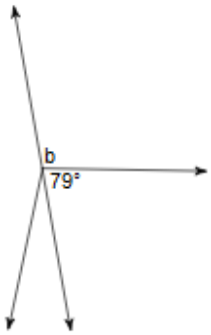
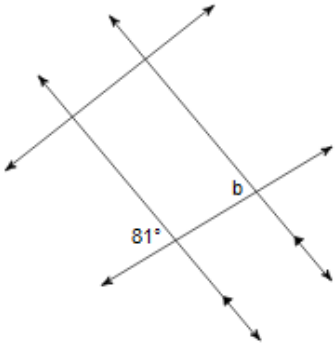


8)



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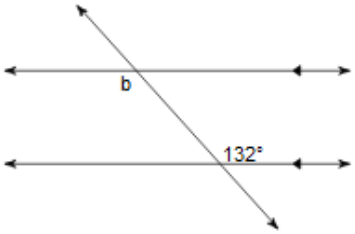

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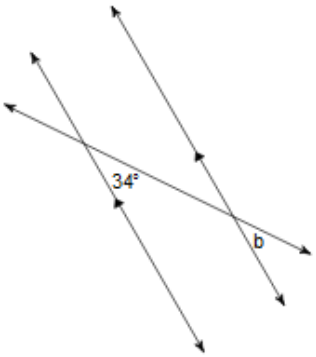
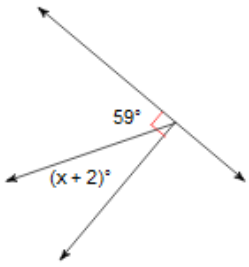


Find the value of x.

11)



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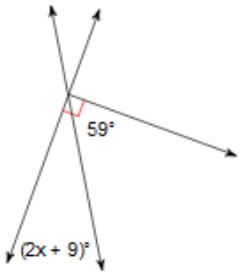

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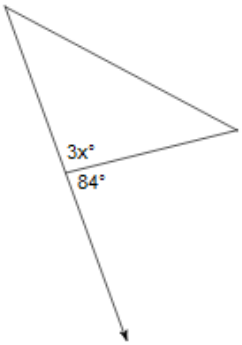


Lesson Plan 3 - Word Problems for Angles

Goals:

- Real life example problems
    - Problem solving skills
    - Teamwork

Structure:

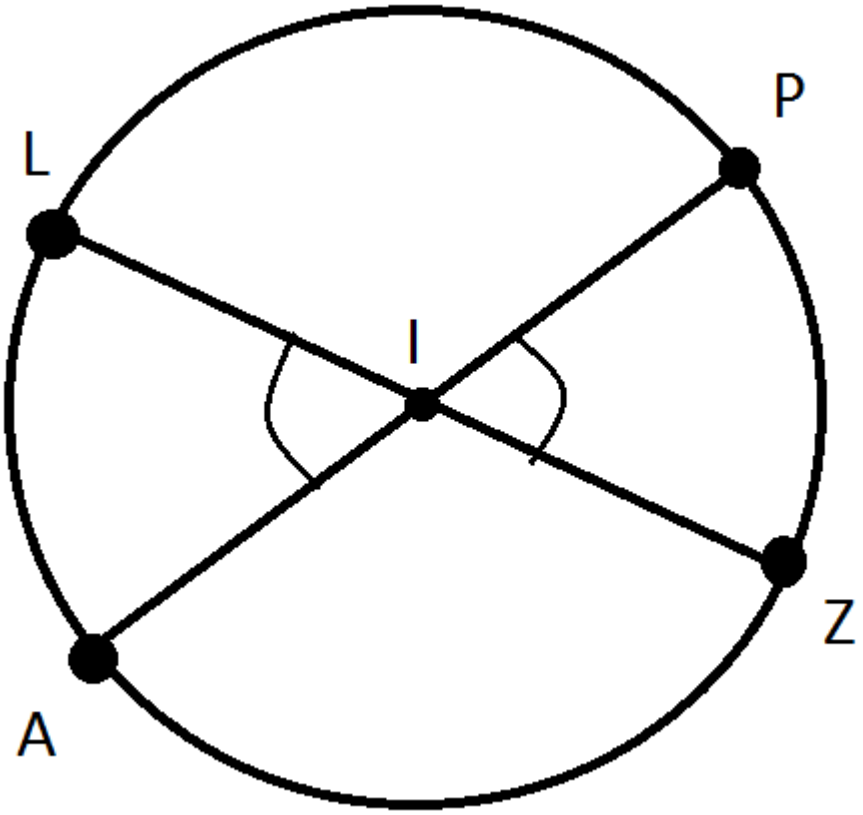
- Do Now
    - Hand students pieces of paper (1-5) and draw a seating chart up on the board so the students know where to sit
    - Have each group of students come up with a team name
- Project problems onto the board - first team to get the solution wins
    - Any random team member may be asked to present the solution, so everyone must be working!
    - Solutions will be collected so everyone must do one
- After a team has “won”, go over the question with the class
- Repeat until questions are done (no more than 7 minutes per question)
- Homework: Have them fill out a google form so I could figure out what students need help on the most and go over it on review day.

Question no. 2 is handwritten.

1)

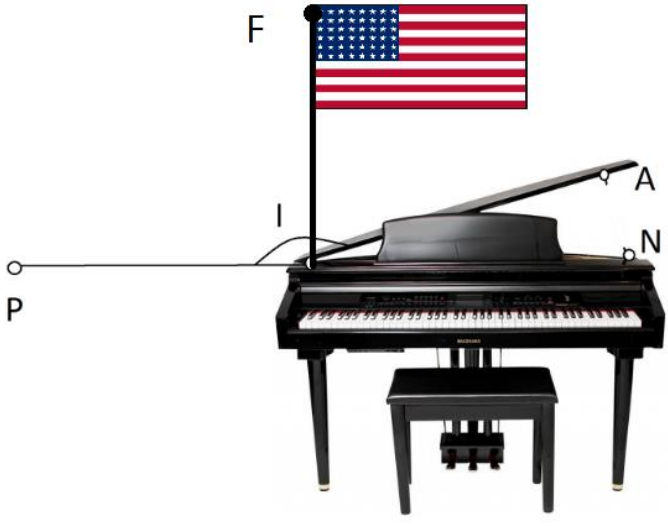
Marco has made a pizza for his friends. He first cuts the pizza in a straight line through points P, I, and A

a) If angle AIZ is 100 degrees, what is the measure of angle PIZ?
b) How would you categorize angles AIZ, AIP, ZIP? Acute, straight, obtuse or right?
c) What is the measure of angle LIA?
d) Measure of AIZ?
e) If Marco wants a pizza slice with the same angle measure as AIZ, what angle demarcates that?
f) Marco’s friend Corre decides that the slice with angle AIZ is too big and wants to split it <u>exactly</u> in half. Draw a ray that would satisfy that requirement. What is the new angle measure of the new angles formed? What could you categorize these angles as?
g) What is the name for and the measurement of an angle that is formed by a line that bisects angle PIA?
h) Name linear pairs, complementary angles, supplementary angles, and vertical angles.


P
L
I
Z
A

3) Beth recently bought a grand piano. The salesperson at the “Grand Pianos R Us” store said that to prevent dust from getting inside the piano, angle AIN should be 45 degrees or less. If angle PIA is currently at 100 degrees, how many degrees should line segment IA be lowered to ensure good piano care?

A flag is placed at the corner of the piano, point I, now creating line segment FI. If IA is supposed to bisect angle FIN, what is the angle measure of FIN and FIA? Assume that angle AIN is the same as your answer from above.



Final Lesson Plans

Lesson Plan Title: 4.5 – Find Square Roots of Quadratic Equations

Teacher's Name: Annika Isaac **Subject/Course: Algebra 2**
Unit: Quadratic Functions **Grade Level: 11 and 12**

Overview of and Motivation for Lesson:
Foundation for solving quadratic equations that model real-life situations

Stage 1-Desired Results

Standard(s):
- Unit 4: Quadratic Functions

Understanding(s):
Students will understand that . . .
- Product property
- Simplify radicals

Essential Question(s):
How can we use the product property to simplify radicals?

Content Objectives:
Knowledge: *Students will know . . .*
- Product property
- Simplify radicals

Skills/Performance: *Students will be able to . . .*
- Critical thinking – looking at a example and figuring out what to do
- Working with others

Language Objectives:
- ***Non-applicable***

Key Vocabulary
Radical, product, square number

Stage 2-Assessment Evidence

Performance Task(s) or Key Evidence
- Individual problems
- Pairs come up to the board to present to class

Other Evidence:
- Click here to enter text.

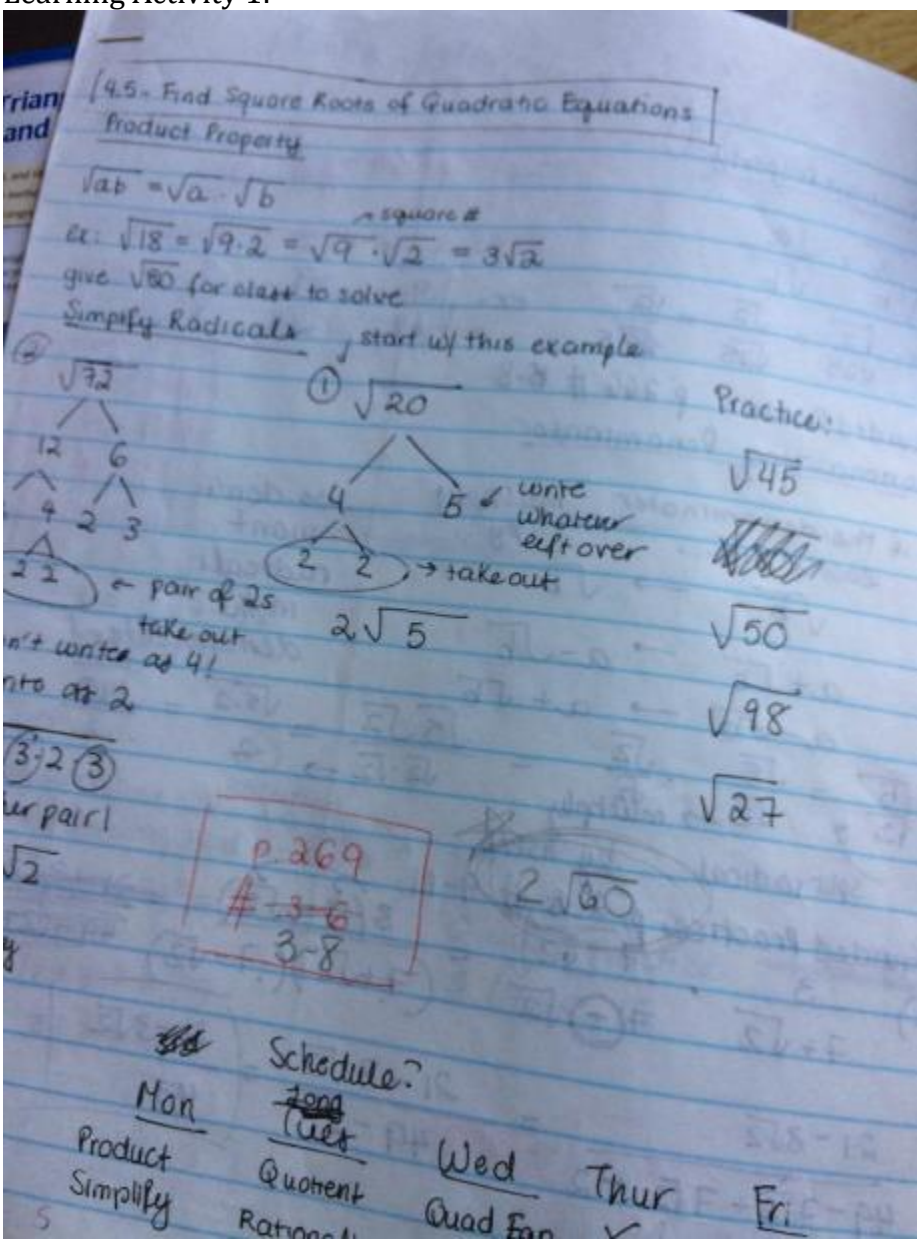
Key Criteria to measure Performance Task (s) or Key Evidence
- Walking around to check progress
- Class participation
- Monitoring group/pair work

Stage 3- Learning Plan

Learning Activities:
Do Now/Bell Ringer/Opener: Factoring question

Learning Activities:
Do Now/Bell Ringer/Opener: Factoring question

Learning Activity 1:



Multiple Intelligences Addressed:

☐ Linguistic	☒ Logical-Mathematical	☐ Musical	☐Bodily-kinesthetic
☐ Spatial	☐ Interpersonal	☐Intrapersonal	☐Naturalistic

Student Grouping

☒ Whole Class	☐ Small Group	☒ Pairs	☒ Individual

Instructional Delivery Methods

☒ Teacher Modeling/Demonstration	☒ Lecture	☐ Discussion
☒ Cooperative Learning	☐ Centers	☒ Problem Solving
☐ Independent Projects		

Lesson Plan Title: 4.5 – Find Square Roots of Quadratic Equations

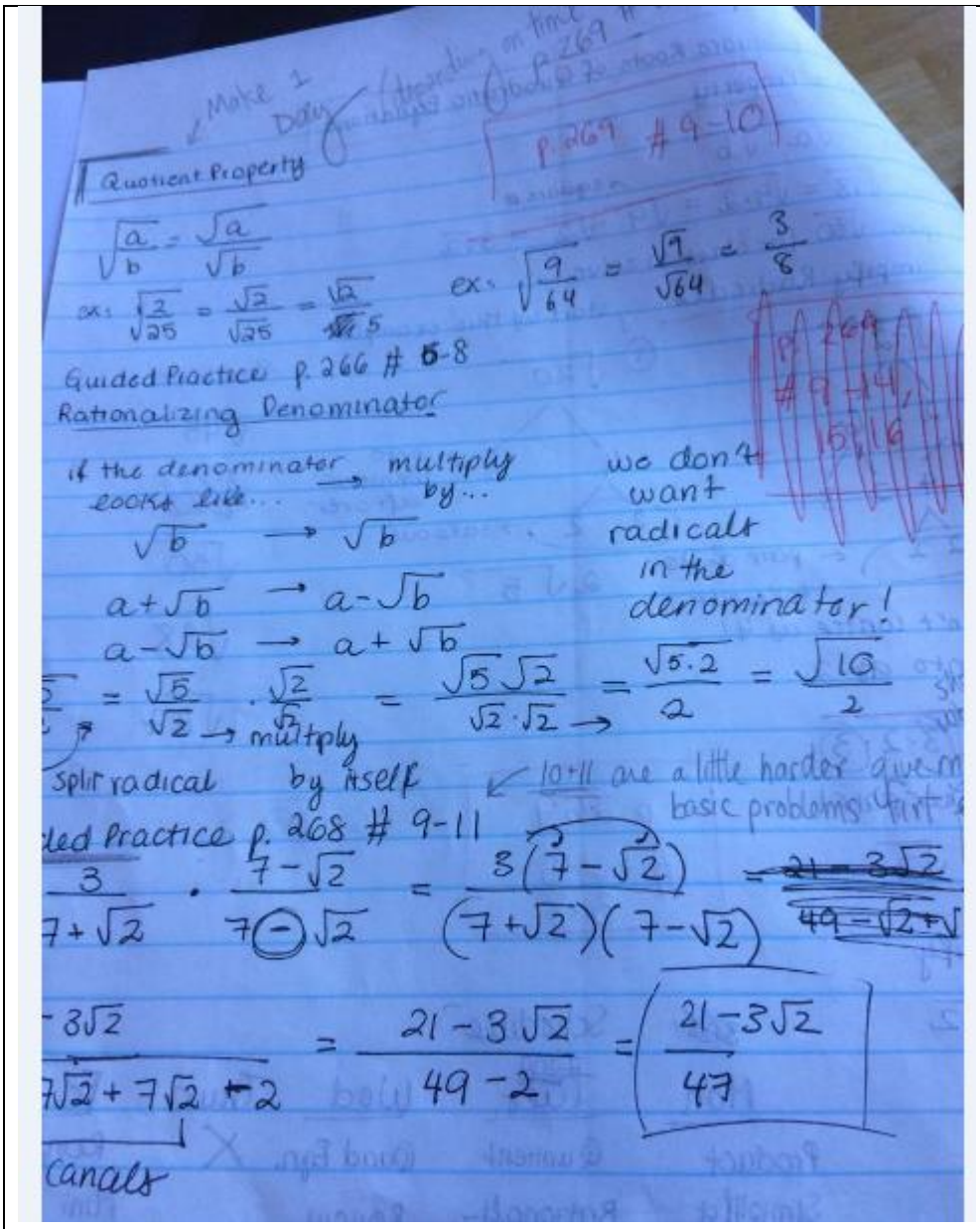
Teacher's Name: Annika Isaac **Subject/Course: Algebra 2**
Unit: Quadratic Functions **Grade Level: 11 and 12**

Overview of and Motivation for Lesson:
Foundation for solving quadratic equations that model real-life situations

<table>
<tr><th colspan="2">Stage 1-Desired Results</th></tr>
<tr><td colspan="2">Standard(s):
• Unit 4: Quadratic Functions</td></tr>
<tr><td>Understanding(s):
Students will understand that . . .
• Quotient property</td><td>Essential Question(s):
How do we use the quotient property for radicals</td></tr>
<tr><td>Content Objectives:
Knowledge: Students will know . . .
• Quotient property

Skills/Performance: Students will be able to . . .
• Critical thinking – looking at a example and figuring out what to do
• Working with others</td><td>Language Objectives:
• Non-applicable</td></tr>
<tr><td colspan="2">Key Vocabulary
Radical, quotient, square number</td></tr>
<tr><th colspan="2">Stage 2-Assessment Evidence</th></tr>
<tr><td>Performance Task(s) or Key Evidence
• Individual problems
• Pairs come up to the board to present to class</td><td>Other Evidence:
• Click here to enter text.</td></tr>
<tr><td colspan="2">Key Criteria to measure Performance Task (s) or Key Evidence
• Walking around to check progress
• Class participation
• Monitoring group/pair work</td></tr>
<tr><th colspan="2">Stage 3- Learning Plan</th></tr>
<tr><td colspan="2">Learning Activities:
Do Now/Bell Ringer/Opener: Simplify Radical (textbook)

Learning Activity 1:</td></tr>
</table>



Multiple Intelligences Addressed:

☐ Linguistic	☒ Logical-Mathematical	☐ Musical	☐Bodily-kinesthetic
☐ Spatial	☐ Interpersonal	☐Intrapersonal	☐Naturalistic

Student Grouping

☒ Whole Class	☐ Small Group	☒ Pairs	☒ Individual

Instructional Delivery Methods

☒ Teacher Modeling/Demonstration	☒ Lecture	☐ Discussion

☒ Cooperative Learning ☐ Centers ☒ Problem Solving ☐ Independent Projects	
Accommodations Speak slowly and break down large vocabulary words Preferential seating for specific students Monitoring student engagement – are they really doing the work or just faking?	**Modifications** Click here to enter text.
Homework/Extension Activities: p. 269 #9-10	
Materials and Equipment Needed: • White board	

Adapted from Grant Wiggins and Jay McTighe-*Understanding by Design*

Lesson Plan Title: 4.5 – Find Square Roots of Quadratic Equations

Teacher's Name: Annika Isaac **Subject/Course: Algebra 2**
Unit: Quadratic Functions **Grade Level: 11 and 12**

Overview of and Motivation for Lesson:
Foundation for solving quadratic equations that model real-life situations

<table>
<tr><th colspan="2">Stage 1-Desired Results</th></tr>
<tr><td colspan="2">Standard(s):
• Unit 4: Quadratic Functions</td></tr>
<tr><td>Understanding(s):
Students will understand that . . .
• Rationalizing denomiator</td><td>Essential Question(s):
How do we use the quotient property for rationalizing the denominator?</td></tr>
<tr><td>Content Objectives:
Knowledge: Students will know . . .
• Quotient property
• Rationalizing denominator

Skills/Performance: Students will be able to . . .
• Critical thinking – looking at a example and figuring out what to do
• Working with others</td><td>Language Objectives:
• Non-applicable</td></tr>
<tr><td colspan="2">Key Vocabulary
Radical, quotient, square number</td></tr>
<tr><th colspan="2">Stage 2-Assessment Evidence</th></tr>
<tr><td>Performance Task(s) or Key Evidence
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<tr><td colspan="2">Learning Activities:
Do Now/Bell Ringer/Opener: Simplify Radical (textbook)

Learning Activity 1:</td></tr>
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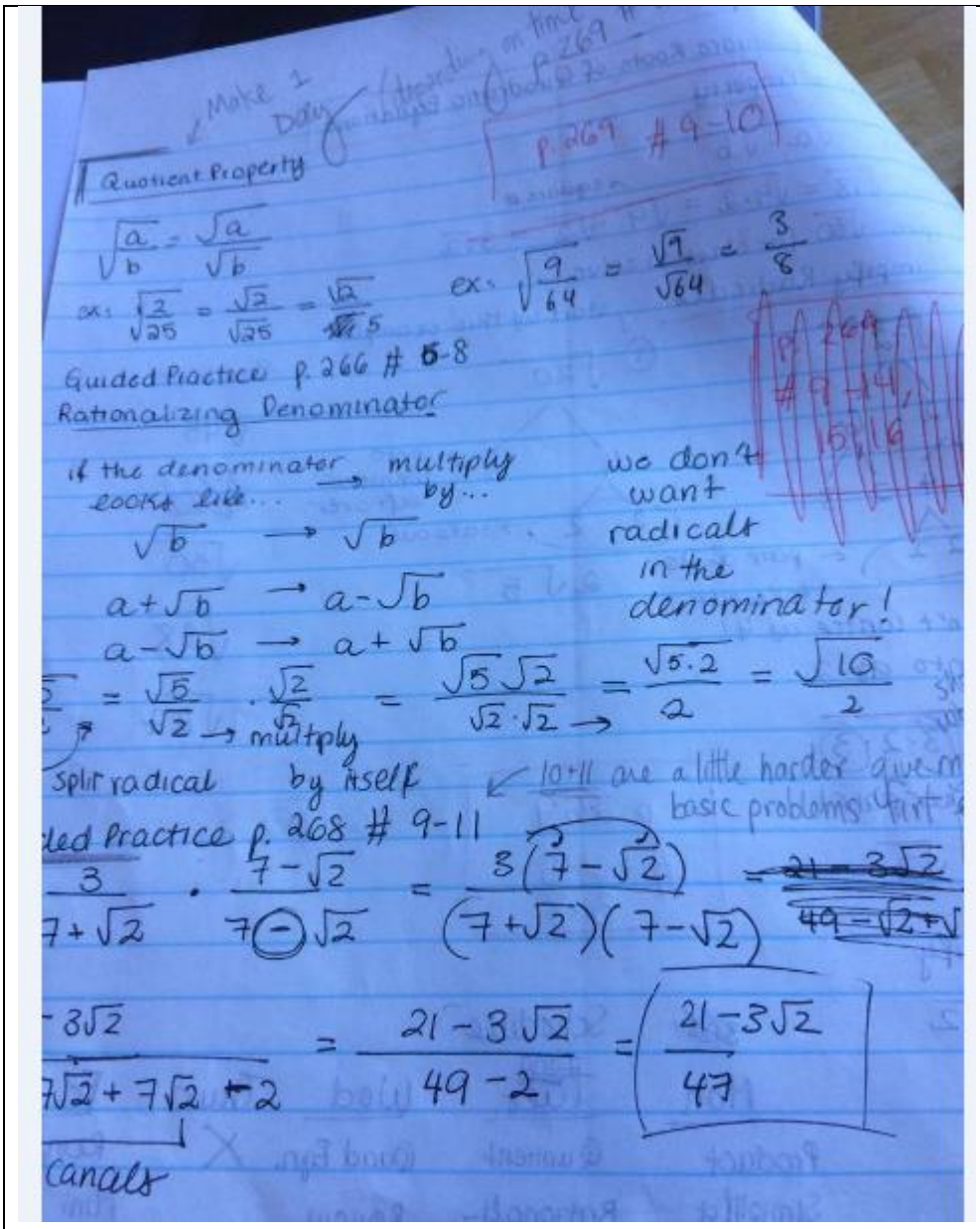

Multiple Intelligences Addressed:

☐ Linguistic	☒ Logical-Mathematical	☐ Musical	☐Bodily-kinesthetic
☐ Spatial	☐ Interpersonal	☐Intrapersonal	☐Naturalistic

Student Grouping

☒ Whole Class ☐ Small Group ☒ Pairs ☒ Individual

Instructional Delivery Methods

☒ Teacher Modeling/Demonstration ☒ Lecture ☐ Discussion

☒ Cooperative Learning ☐ Centers ☒ Problem Solving ☐ Independent Projects	
Accommodations Speak slowly and break down large vocabulary words Preferential seating for specific students Monitoring student engagement – are they really doing the work or just faking?	**Modifications** Click here to enter text.
Homework/Extension Activities: p. 269 #11-16	
Materials and Equipment Needed: • White board	

Adapted from Grant Wiggins and Jay McTighe-*Understanding by Design*

Lesson Plan Title: 4.5 – Find Square Roots of Quadratic Equations

Teacher's Name: Annika Isaac **Subject/Course: Algebra 2**
Unit: Quadratic Functions **Grade Level: 11 and 12**

Overview of and Motivation for Lesson:
Foundation for solving quadratic equations that model real-life situations

<table>
<tr><th colspan="2">Stage 1-Desired Results</th></tr>
<tr><td colspan="2">Standard(s):
• Unit 4: Quadratic Functions</td></tr>
<tr><td>Understanding(s):
Students will understand that . . .
• Rationalizing denomiator</td><td>Essential Question(s):
How do we use the quotient property for rationalizing the denominator?</td></tr>
<tr><td>Content Objectives:
Knowledge: Students will know . . .
• Quotient property
• Rationalizing denominator

Skills/Performance: Students will be able to . . .
• Critical thinking – looking at a example and figuring out what to do
• Working with others</td><td>Language Objectives:
• Non-applicable</td></tr>
<tr><td colspan="2">Key Vocabulary
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<tr><th colspan="2">Stage 2-Assessment Evidence</th></tr>
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<tr><td colspan="2">Learning Activities:
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Learning Activity 1:</td></tr>
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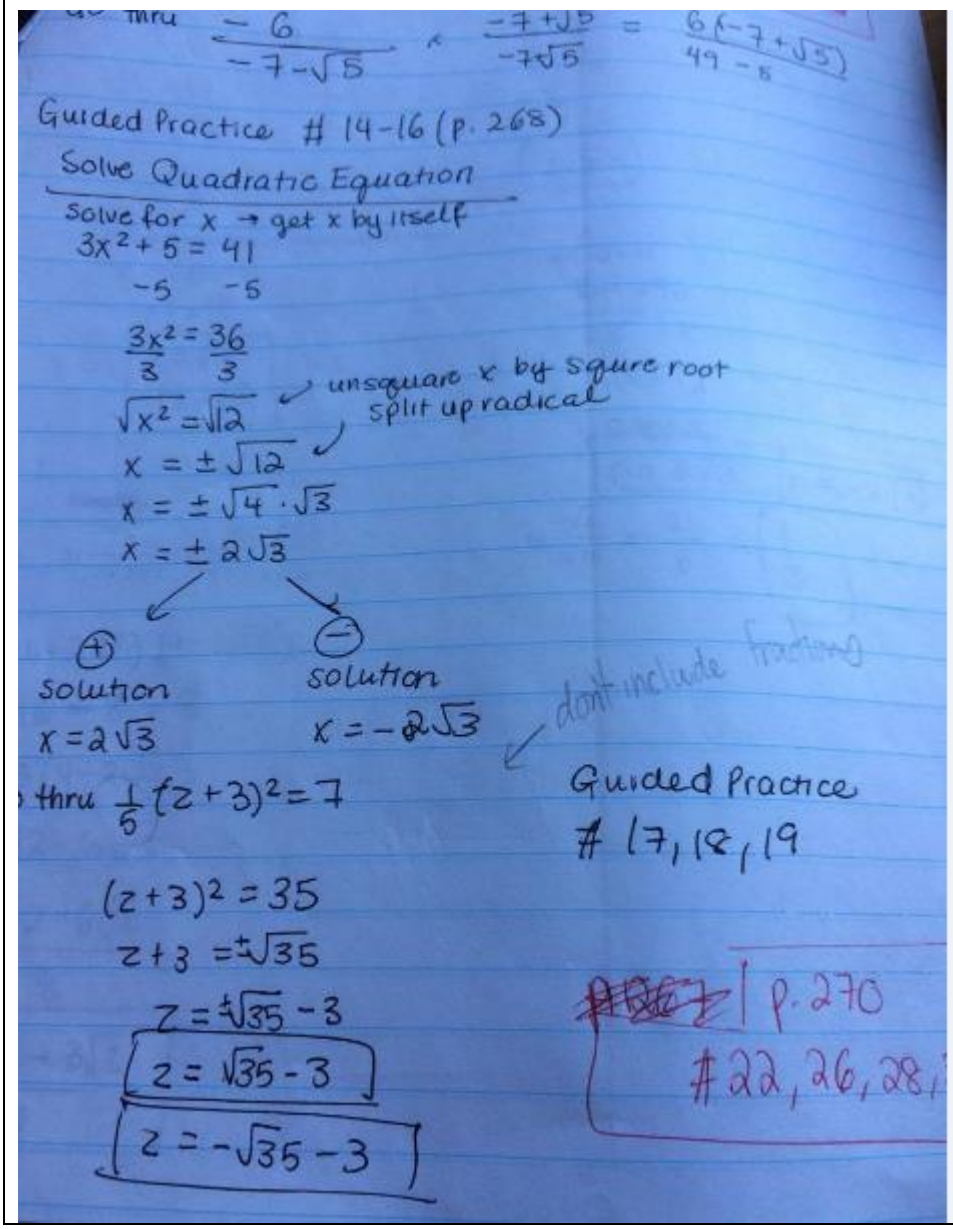

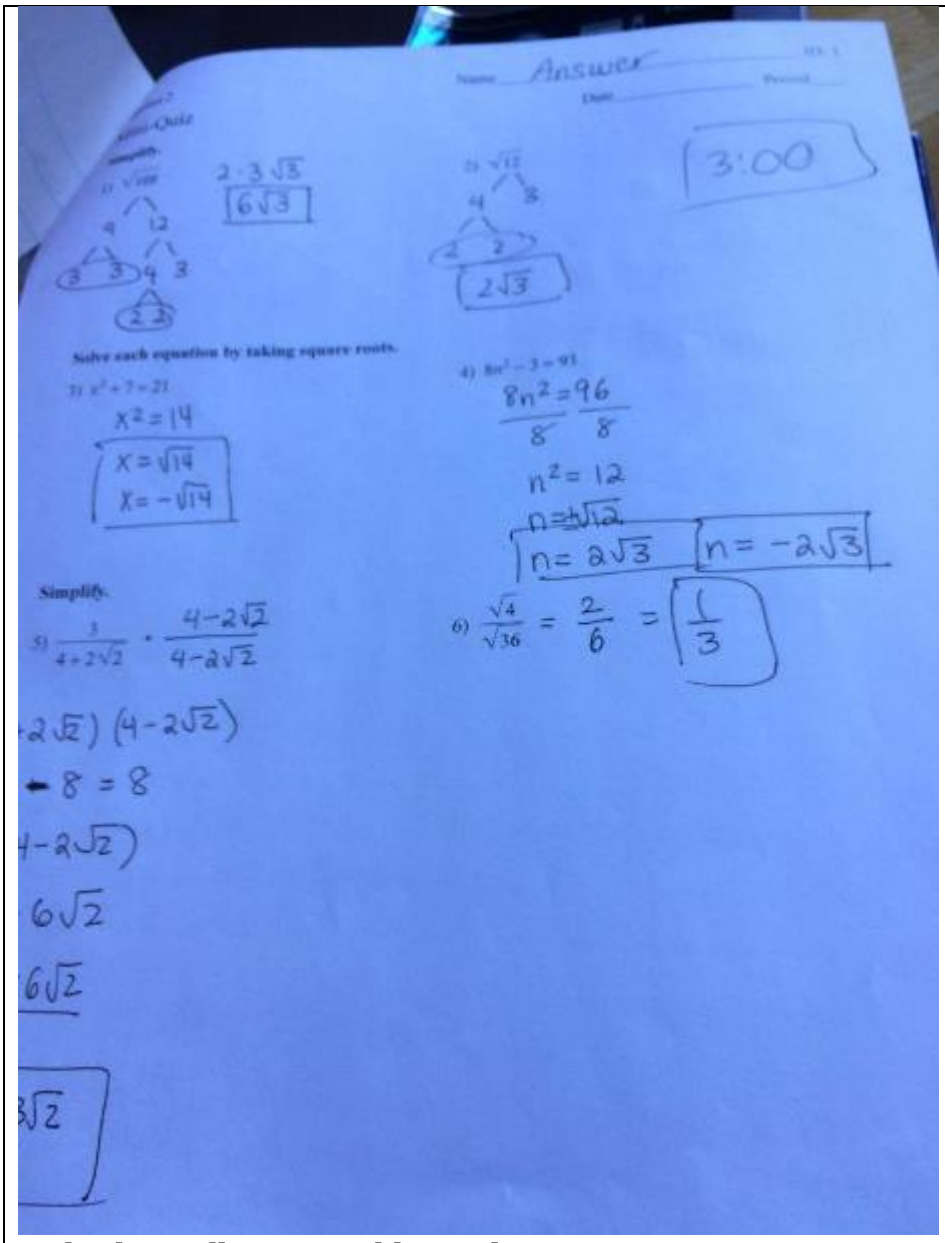

Multiple Intelligences Addressed:

☐ Linguistic	☒ Logical-Mathematical	☐ Musical	☐Bodily-kinesthetic
☐ Spatial	☐ Interpersonal	☐Intrapersonal	☐Naturalistic

Student Grouping

☒ Whole Class	☐ Small Group	☒ Pairs	☒ Individual

Instructional Delivery Methods

☒ Teacher Modeling/Demonstration	☒ Lecture	☐ Discussion
☒ Cooperative Learning	☐ Centers	☒ Problem Solving
☐ Independent Projects		

Accommodations Speak slowly and break down large vocabulary words Preferential seating for specific students Monitoring student engagement – are they really doing the work or just faking?	**Modifications** Click here to enter text.
Homework/Extension Activities: p. 270 #22,26,28,33	
Materials and Equipment Needed: • White board	

Adapted from Grant Wiggins and Jay McTighe-*Understanding by Design*

Lesson Plan Title: 4.2 – Apply Congruence and Triangles

Teacher's Name: Annika Isaac **Subject/Course: Honors Geometry**
Unit: Chapter 4 **Grade Level: 9 and 10**

Overview of and Motivation for Lesson:
Logical Reasoning and Proof

<table>
<tr><th colspan="2">Stage 1-Desired Results</th></tr>
<tr><td colspan="2">Standard(s):
• UNIT 3: Triangle Congruence</td></tr>
<tr><td>Understanding(s):
Students will understand that . . .
• Identify congruent triangles
• Solve for x and y (algebra) using congruent triangles</td><td>Essential Question(s):
How can we use congruent triangles to solve for missing sides and angles?</td></tr>
<tr><td>Content Objectives:
Knowledge: Students will know . . .
• Identify congruent sides
• Identify congruent angles
• Algebraically solve for x and y (after geometry component)

Skills/Performance: Students will be able to . . .
• Reason logically
• Work with others</td><td>Language Objectives:
Non-applicable</td></tr>
<tr><td colspan="2">Key Vocabulary
Congruency, Corresponding</td></tr>
<tr><th colspan="2">Stage 2-Assessment Evidence</th></tr>
<tr><td>Performance Task(s) or Key Evidence
• Class participation
• Independent questions to work on – walk around and check progress and accuracy
• Exit slips</td><td>Other Evidence:
• Non-applicable</td></tr>
<tr><td colspan="2">Key Criteria to measure Performance Task (s) or Key Evidence
• Are they able to see how sides and angles correspond?
• Can students set up the appropriate equations based off corresponding sides and angles?
• Using their geometry knowledge, are they able to take it to the next step and solve for x and y algebraically?</td></tr>
<tr><th colspan="2">Stage 3- Learning Plan</th></tr>
<tr><td colspan="2">Learning Activities:</td></tr>
</table>

Do Now/Bell Ringer/Opener: Triangle question from Exam

Learning Activity 1:

- Congruent figures - all parts of the figure are congruent to corresponding parts of the other figure (sides and angles)
- Project the two triangles on p. 225
- Go through corresponding angles and sides
  - Which ones match?
- Example 1 p.225 - have someone do angles, have another volunteer do sides
  - HAVE TO MATCH UP LETTERS IN FINAL ANSWER
- Example 2 p. 226 - do with class
- Guided Practice 1,2 p. 226
  - 1,2 - class try in pairs
  - Pairs go up to the board to explain
- Example 3 p. 226
- Guided Practice 3 p. 226

HOMEWORK: P. 228 #3, 5-10, 11-14

Multiple Intelligences Addressed:

☐ Linguistic	☒ Logical-Mathematical	☐ Musical	☐Bodily-kinesthetic
☐ Spatial	☐ Interpersonal	☐Intrapersonal	☐Naturalistic

Student Grouping

☒ Whole Class	☐ Small Group	☒ Pairs	☒ Individual

Instructional Delivery Methods

☒ Teacher Modeling/Demonstration	☒ Lecture	☒ Discussion
☒ Cooperative Learning	☐ Centers	☒ Problem Solving
☐ Independent Projects		

Accommodations	**Modifications**
Speak slowly Make sure kids are on task and taking notes	Click here to enter text.

Homework/Extension Activities:

HOMEWORK: P. 228 #15,16,19,20

HOMEWORK: P. 228 #3, 5-10, 11-14

Materials and Equipment Needed:

- White board
- Elmo projector

Adapted from Grant Wiggins and Jay McTighe-*Understanding by Design*

Lesson Plan Title: 4.2 – Apply Congruence and Triangles

Teacher's Name: Annika Isaac **Subject/Course: Honors Geometry**
Unit: Chapter 4 **Grade Level: 9 and 10**

Overview of and Motivation for Lesson:
Logical Reasoning and Proof

<table>
<tr><th colspan="2">Stage 1-Desired Results</th></tr>
<tr><td colspan="2">Standard(s):
• UNIT 3: Triangle Congruence</td></tr>
<tr><td>Understanding(s):
Students will understand that . . .
• Identify congruent triangles
• Solve for x and y (algebra) using congruent triangles</td><td>Essential Question(s):
How can we use congruent triangles to solve for missing sides and angles?</td></tr>
<tr><td>Content Objectives:
Knowledge: Students will know . . .
• Identify congruent sides
• Identify congruent angles
• Algebraically solve for x and y (after geometry component)

Skills/Performance: Students will be able to . . .
• Reason logically
• Work with others</td><td>Language Objectives:
Non-applicable</td></tr>
<tr><td colspan="2">Key Vocabulary
Congruency, Corresponding</td></tr>
<tr><th colspan="2">Stage 2-Assessment Evidence</th></tr>
<tr><td>Performance Task(s) or Key Evidence
• Class participation
• Independent questions to work on – walk around and check progress and accuracy
• Exit slips</td><td>Other Evidence:
• Non-applicable</td></tr>
<tr><td colspan="2">Key Criteria to measure Performance Task (s) or Key Evidence
• Are they able to see how sides and angles correspond?
• Can students set up the appropriate equations based off corresponding sides and angles?
• Using their geometry knowledge, are they able to take it to the next step and solve for x and y algebraically?</td></tr>
<tr><th colspan="2">Stage 3- Learning Plan</th></tr>
<tr><td colspan="2">Learning Activities:</td></tr>
</table>

Do Now/Bell Ringer/Opener: Draw example in notebook – 2 congruent triangles

Learning Activity 1:

- Go over last night's homework
- Third Angles Theorem - p. 227
- Example 4 p. 227
- Guided Practice #4
- Example 5 p. 227
  - We need to prove all sides are equal - what side do we need to prove is equal? AC = AC
  - We need to prove all angles are equal - what angle do we need to prove is equal? B and D
- Project Theorem p. 228

HOMEWORK: P. 228 #15,16,19,20

Multiple Intelligences Addressed:

☐ Linguistic	☒ Logical-Mathematical	☐ Musical	☐Bodily-kinesthetic
☐ Spatial	☐ Interpersonal	☐Intrapersonal	☐Naturalistic

Student Grouping

☒ Whole Class	☐ Small Group	☒ Pairs	☒ Individual

Instructional Delivery Methods

☒ Teacher Modeling/Demonstration	☒ Lecture	☒ Discussion
☒ Cooperative Learning	☐ Centers	☒ Problem Solving
☐ Independent Projects		

Accommodations	**Modifications**
Speak slowly Make sure kids are on task and taking notes	Click here to enter text.

Homework/Extension Activities:

HOMEWORK: P. 228 #15,16,19,20
HOMEWORK: P. 228 #3, 5-10, 11-14

Materials and Equipment Needed:

- White board
- Elmo projector

Adapted from Grant Wiggins and Jay McTighe-*Understanding by Design*

Lesson Plan Title: 4.3-Prove Triangles Congruent through SSS

Teacher's Name: Annika Isaac **Subject/Course: Honors Geometry**
Unit: Chapter 4 **Grade Level: 9 and 10**

Overview of and Motivation for Lesson:
Logical Reasoning and Proof

<table>
<tr><th colspan="2">Stage 1-Desired Results</th></tr>
<tr><td colspan="2">Standard(s):
• UNIT 3: Triangle Congruence</td></tr>
<tr><td>Understanding(s):
Students will understand that . . .
• SSS is a method to prove triangle congruency</td><td>Essential Question(s):
How can we use logical reasoning to prove triangle congruency? (Specifically SSS)</td></tr>
<tr><td>Content Objectives:
Knowledge: Students will know . . .
• Write a 2 column proof for SSS

Skills/Performance: Students will be able to . . .
• Reason logically
• Work with others
• Prove using geometric reasoning</td><td>Language Objectives:
Non-applicable</td></tr>
<tr><td colspan="2">Key Vocabulary
Congruency, Corresponding</td></tr>
<tr><th colspan="2">Stage 2-Assessment Evidence</th></tr>
<tr><td>Performance Task(s) or Key Evidence
• Class participation
• Independent questions to work on – walk around and check progress and accuracy</td><td>Other Evidence:
• Non-applicable</td></tr>
<tr><td colspan="2">Key Criteria to measure Performance Task (s) or Key Evidence
• Are students able to recognize congruent sides and prove it using geometric reasoning?</td></tr>
<tr><th colspan="2">Stage 3- Learning Plan</th></tr>
<tr><td colspan="2">Learning Activities:
Do Now/Bell Ringer/Opener: Do Now: (Congruent Triangles)
Guided Practice #5 p. 227

Learning Activity 1:
• SSS Congruence Postulate p. 234</td></tr>
</table>

- Example 1
  - Make a 2 column proof
  - Know we have to prove each side length is equal - has to be included in proof
- Guided practice 1,2
- p. 238 #24,25

HW: p. 238 #5-7, 26, 27 , 21

Multiple Intelligences Addressed:

☐ Linguistic	☒ Logical-Mathematical	☐ Musical	☐Bodily-kinesthetic
☐ Spatial	☐ Interpersonal	☐Intrapersonal	☐Naturalistic

Student Grouping

☒ Whole Class	☐ Small Group	☒ Pairs	☒ Individual

Instructional Delivery Methods

☒ Teacher Modeling/Demonstration	☒ Lecture	☒ Discussion
☒ Cooperative Learning	☐ Centers	☒ Problem Solving
☐ Independent Projects		

Accommodations	**Modifications**
Speak slowly Make sure kids are on task and taking notes	Click here to enter text.

Homework/Extension Activities:

HW: p. 238 #5-7, 26, 27 , 21

Materials and Equipment Needed:

- White board
- Elmo projector

Adapted from Grant Wiggins and Jay McTighe-*Understanding by Design*

Lesson Plan Title: 4.4 - Prove Triangle Congruence by SAS and HL
Teacher's Name: Annika Isaac **Subject/Course: Honors Geometry**
Unit: Chapter 4 **Grade Level: 9 and 10**

Overview of and Motivation for Lesson:
Logical Reasoning and Proof

<table>
<tr><th colspan="2">Stage 1-Desired Results</th></tr>
<tr><td colspan="2">Standard(s):
• UNIT 3: Triangle Congruence</td></tr>
<tr><td>Understanding(s):
Students will understand that . . .
• You can prove triangle congruency through SAS
• You can prove triangle congruency through HL</td><td>Essential Question(s):
How can we prove that triangles are congruent using SAS and HL?

How can we begin to incorporate logical reasoning into mathematical proofs?</td></tr>
<tr><td>Content Objectives:
Knowledge: Students will know . . .
• How to prove congruency through SAS and HL
• Write 2 column proofs

Skills/Performance: Students will be able to . . .
• Reason logically
• Work with others</td><td>Language Objectives:
Non-applicable</td></tr>
<tr><td colspan="2">Key Vocabulary
Congruency, Corresponding, Hypotenuse, Leg, Right Triangle</td></tr>
<tr><th colspan="2">Stage 2-Assessment Evidence</th></tr>
<tr><td>Performance Task(s) or Key Evidence
• Class participation
• Independent questions to work on – walk around and check progress and accuracy</td><td>Other Evidence:
• Non-applicable</td></tr>
<tr><td colspan="2">Key Criteria to measure Performance Task (s) or Key Evidence
• Are they able to see how sides and angles correspond?
• Can students set up the appropriate equations based off corresponding sides and angles?
• Using their geometry knowledge, are they able to take it to the next step and solve for x and y algebraically?</td></tr>
<tr><th colspan="2">Stage 3- Learning Plan</th></tr>
<tr><td colspan="2">Learning Activities:</td></tr>
</table>

Do Now/Bell Ringer/Opener: Do Now:
P. 239 #4-6

Learning Activity 1:
Go over homework questions

SAS Postulate p. 240
Example 1
- Go through how we need to prove 1 side, 1 angle, and another side congruence

Example 2
- Write as 2 column proof? How? You can do a 2 column proof if you want or just have them explain that SM, RM, MP, MQ are all radii and that there are vertical angles. It doesn't need to be a formal 2 column proof though

Guided Practice p. 241 Don't do. Give them a basic example instead (Similar to 9-14)
SSA doesn't always work! NO SWEARS!- draw two different examples p. 241
HL Theorem p. 241
Example 3
- Redraw triangles
- Identify hypotenuse, leg, right triangle

Guided Practice p. 242

Multiple Intelligences Addressed:

☐ Linguistic	☒ Logical-Mathematical	☐ Musical	☐Bodily-kinesthetic
☐ Spatial	☐ Interpersonal	☐Intrapersonal	☐Naturalistic

Student Grouping

☒ Whole Class	☐ Small Group	☒ Pairs	☒ Individual

Instructional Delivery Methods

☒ Teacher Modeling/Demonstration	☒ Lecture	☒ Discussion
☒ Cooperative Learning	☐ Centers	☒ Problem Solving
☐ Independent Projects		

Accommodations	**Modifications**
Speak slowly Make sure kids are on task and taking notes	Click here to enter text.

Homework/Extension Activities:
HW: p. 244 #20-22, 25-27 9-15

Materials and Equipment Needed:
- White board
- Elmo projector

Lesson Plan Title: 4.5 - Prove Triangles Congruent by ASA and AAS
Teacher's Name: Annika Isaac **Subject/Course: Honors Geometry**
Unit: Chapter 4 **Grade Level: 9 and 10**

Overview of and Motivation for Lesson:
Logical Reasoning and Proof

<table>
<tr><th colspan="2">Stage 1-Desired Results</th></tr>
<tr><td colspan="2">Standard(s):
• UNIT 3: Triangle Congruence</td></tr>
<tr><td>Understanding(s):
Students will understand that . . .
• You can prove triangle congruency through AAS
• You can prove triangle congruency through ASA</td><td>Essential Question(s):
How can we prove that triangles are congruent using AAS and ASA?

How can we begin to incorporate logical reasoning into mathematical proofs?</td></tr>
<tr><td>Content Objectives:
Knowledge: Students will know . . .
• How to prove congruency through ASA and AAS
• Write 2 column proofs

Skills/Performance: Students will be able to . . .
• Reason logically
• Work with others</td><td>Language Objectives:
Non-applicable</td></tr>
<tr><td colspan="2">Key Vocabulary
Congruency, Corresponding</td></tr>
<tr><th colspan="2">Stage 2-Assessment Evidence</th></tr>
<tr><td>Performance Task(s) or Key Evidence
• Class participation
• Independent questions to work on – walk around and check progress and accuracy</td><td>Other Evidence:
• Non-applicable</td></tr>
<tr><td colspan="2">Key Criteria to measure Performance Task (s) or Key Evidence
• Are students able to recognize ASA and AAS?
• After they recognize which kind of reasoning, can they write a 2 column proof?</td></tr>
<tr><th colspan="2">Stage 3- Learning Plan</th></tr>
<tr><td colspan="2">Learning Activities:
Do Now/Bell Ringer/Opener: Do Now:</td></tr>
</table>

P. 245 #35,36

Learning Activity 1:
Go over homework

P. 249 Postulate 21
P. 249 Postulate 22
Example 1 p. 250
Guided Practice p. 250
Example 3 p. 251 - write as 2 column proof
Guided Practice #3

Work on making notesheet
- Turn paper horizontally
- P. 252

HW: p. 252 #3-5, 8-10, 31

Multiple Intelligences Addressed:

☐ Linguistic	☒ Logical-Mathematical	☐ Musical	☐Bodily-kinesthetic
☐ Spatial	☐ Interpersonal	☐Intrapersonal	☐Naturalistic

Student Grouping

☒ Whole Class	☐ Small Group	☒ Pairs	☒ Individual

Instructional Delivery Methods

☒ Teacher Modeling/Demonstration	☒ Lecture	☒ Discussion
☒ Cooperative Learning	☐ Centers	☒ Problem Solving
☐ Independent Projects		

Accommodations	**Modifications**
Speak slowly Make sure kids are on task and taking notes	Click here to enter text.

Homework/Extension Activities:
HW: p. 252 #3-5, 8-10, 31

Materials and Equipment Needed:
- White board
- Elmo projector

Adapted from Grant Wiggins and Jay McTighe-*Understanding by Design*