<table>
<thead>
<tr>
<th>Instructor: [Redacted]</th>
<th>Course: Honors Algebra II</th>
</tr>
</thead>
</table>
| **Objective(s):** The Students will... | - Divide polynomials using long division.  
- Divide polynomials using synthetic division. |
| **Related Curriculum Standard:** | 2.1.11A- Use operations. |
| **Activities/Procedures:** | - Review yesterday’s lesson-classify polynomials by degree and number activity (Students will be given slips of paper with a polynomial on it. They will have to tape it to the board under the category in which it belongs.)  
- Relate polynomial division to regular long division.  
- Two polynomial long division examples  
- Check if a polynomial is a factor of another polynomial (if there is no remainder)  
- Two synthetic division problems. |
| **Materials/resources:** | Smart Board  
Prentice Hall Mathematics- Algebra II book |
| **Assessment:** | Questioning  
Key Questions:  
- If the remainder does not equal zero, why is the polynomial not a factor?  
- How can we check our division?  
- Why do we multiply by the opposite of the constant in the divisor?  
Observe individual/partner/group work |
| **Homework:** | Page 324 #2-9, 14-22 evens |
After teaching a lesson on polynomial long division and synthetic division, I let the students start working on their homework during class. I wanted to see what they knew how to do and to answer any questions that they had. There was not enough time in the period to complete the assignment, but I collected how much the students had done so far. I decided to check everyone’s for correctness since there were only a few on each student’s paper.

One of the biggest mistakes that I found on various students’ papers was mistakes in subtracting negative numbers. I reminded the students that subtracting a negative number is the same as adding a positive number. One student admitted that she has never been good at this concept. I explained to her that subtracting is moving left on the number line. But, if we are subtracting a negative number, we are moving to the right which is the same as adding. The explanation seemed to make sense to her. Even though she knew that subtracting a negative number is the same as adding, she did not understand why it worked the way that it does. The number line explanation cleared it up for her.

In a previous lesson reflection, I decided that I would need to write out specific “instructions”. In this lesson, I gave students explicit instructions in their notebooks. The students seemed to understand the process a lot better this time. As a Learning Theorist, I adapted my lesson to reach diverse learners. The students heard me say the directions, saw the directions as they wrote them down, and used the directions to solve problems as a class and on their own. This lesson involved verbal, visual, and kinesthetic learners. I am happy that I gave students these instructions because the students did very well on this assignment overall. Again, most mistakes were in arithmetic and not in the process of dividing polynomials.
page 324 # 2-8 + 14-22 evens

2) \( (3x^2 + 7x - 20) \div (x + 4) = 3x - 5 \)

\[
\begin{array}{r}
3x - 5 \\
3x^2 + 12x \\
-5x - 20 \\
-5x - 20 \\
0
\end{array}
\]

4) \( (2x^3 - 3x^2 - 18x - 8) \div (x - 4) = 2x^2 + 5x - 2 \)

\[
\begin{array}{r}
2x^2 + 5x - 2 \\
2x^3 - 8x^2 \\
-5x^2 - 18x \\
-5x^2 - 20x \\
-2x - 8 \\
-2x + 8 \\
0
\end{array}
\]

6) \( (9x^2 - 24x - 20) \div (x - 1) \)

\[
\begin{array}{r}
9x - 12 \\
9x^2 - 21x - 20 \\
-12x - 20 \\
-12x + 12 \\
0 = 832
\end{array}
\]

8) \( (x^3 - 13x - 12) \div (x - 4) \)

\[
\begin{array}{r}
-20 - 12 \\
-20 + 12 \\
= -32
\end{array}
\]
good work!

P. 324 # 2-8  # 14-22 (even)

2) $(3x^2 + 7x - 20) - (x + 4)$
   
   
   $3x - 5$
   
   $x + 4| 3x^2 + 7x - 20$
   
   $-3x^2 + 12x$
   
   $3x - 20$
   
   $-3x - 20$
   
   $-5x - 20$
   
   $2x - 8$
   
   $3x - 12$
   
   $(x - 1)$

4) $(2x^3 - 3x^2 - 18x - 8) - (x - 4)$
   
   
   $2x^2 + x + 2$
   
   $x - 4| 2x^3 - 3x^2 - 18x - 8$
   
   $-2x^2 - 8x$
   
   $-5x^2 - 18x$
   
   $-9x^2 - 20x$
   
   $2x - 8$
   
   $2x - 8$
   
   $0$

6) $(9x^2 - 21x - 20) ÷ (x - 1)$
   
   
   $12 - 32$
   
   $x - 1| 9x^2 - 21x - 20$
   
   $-9x^2 + 9x$
   
   $-12x - 20$
   
   $12x - 20$
   
   $-3x - 12$
   
   $3x - 12$
   
   $0$

14) $(x^3 - 4x^2 + (4x - 4)) ÷ (x - 2)$

| 2 | 1 | -4 | 6 | -4 | 5 | 1 | -3 | -5 | -2 | S

| 2 | +2 | +4 | +4 | +5 | +10 | +2S |

$1 - 2 | 2 | 0$

$x^2 - 2x + 2$

$2x^2 + 2x + 5$

18) $(-2x^3 + 5x^2 - x + 2) ÷ (x + 2)$
<table>
<thead>
<tr>
<th>Instructor:</th>
<th>Course: Integrated Math</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objective(s): The Students will...</td>
<td>• Determine which horse will win the horserace using probability of rolling 2-12 on dice.</td>
</tr>
<tr>
<td>Related Curriculum Standard:</td>
<td>• 2.7.11.D. Use experimental and theoretical probability distributions to make judgments about the likelihood of various outcomes in uncertain situations.</td>
</tr>
</tbody>
</table>
| Activities/Procedures: | • Students will pick which horse they would like to be and write it on a tented note card in front of them. We will sit in a circle so everyone can see each others' choice.  
• On the Smart Board using virtual dice, we will roll and record the sum of the two dice. Whichever horse gets all the way to the finish line wins.  
• Together we will answer the questions on the back of the worksheet. Students should realize that the middle numbers have a better chance of winning because they have more combinations that will add together to that number. |
| Materials/resources: | • Note cards and markers  
• Smart Board/virtual dice  
• "A Day at the Races" worksheet |
| Assessment: | I will collect the worksheets and the students will receive classroom points.  
Key Questions:  
• Is the race fair?  
• Does every horse have an equal chance of winning?  
• Which horse has the most combinations? Does that give it a better chance of winning? |
To kick off a unit on probability, I used a lesson that would bring the concepts into real life. The students were given a worksheet called “A Day at the Races” and we used virtual dice on the Smart Board. The students each picked a horse and wrote it on a tented note card. We sat in a circle so everyone could see which horse each person picked. We rolled two dice and added up the two numbers. We recorded that sum as the horse’s number. Whichever horse got to the finish line first won the race.

The students were very interested in this lesson and cheered their horses on. They wanted to switch horses to the ones who were winning. On the back of the worksheet, we decided if the race was fair or not. The students first said that it was fair because each number has an equal chance of coming up on the die. I decided to not answer the question and move on. We wrote down all of the possible outcomes and saw that not every horse had an equal chance of being rolled. So, we went back to the question later and decided that it was not a fair race.

As a Master Practitioner, I used technology to support the teaching and learning. It was much easier for everyone to see the virtual dice than using real dice. I have seen this lesson done before, and students worked in groups and each group had their own set of dice. The classroom became very loud and dice were flying everywhere. This way, we would all have the same data. As a lower level class, it is important to all stay together so nobody gets lost. The students shut down if they get lost. The students liked passing around the Air Slate so everyone could take a turn rolling the dice. The technology also ensured that the die rolling was fair.
A DAY AT THE RACES

Pick your horse and see if you're a winner! You have 11 horses to choose from, numbered #2 through #12:

2- Snake Eyes  
3- Trifecta  
4- Funky Quad Medina  
5- Eliminator  
6- Matrix Reloaded  
7- Big Bad Ben  
8- Probability Not  
9- Maximizer  
10- San Antonio  
11- Dysfunctional  
12- Pair-a-dice

Write the number of your horse on a folded index card and place it in front of you so everyone knows which horse is yours. To start the race, roll a pair of dice and add the result together. The horse who matches the sum moves forward one space. Mark an X in the box next to the horse's number each time it moves. The first horse to move all of the way to the finish line is the winner.

<table>
<thead>
<tr>
<th>Horse Number</th>
<th>Start</th>
<th></th>
<th></th>
<th></th>
<th>Finish</th>
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<tr>
<td>2</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
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<tr>
<td>3</td>
<td>X</td>
<td>X</td>
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<td>X</td>
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</tr>
<tr>
<td>5</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
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<td>8</td>
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<td>X</td>
<td></td>
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<tr>
<td>9</td>
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<tr>
<td>11</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

WINNER!
After the race:

1. Was the race a fair race? Do you think that every horse had an equal chance to win?
   
   **No**, because the middle numbers had a better chance of rolling numbers that add up to 5-9.

2. How many possible outcomes are there for rolling a pair of dice and adding their sums? Is rolling a 2 and a 1 different from rolling a 1 and a 2?

   
   \[
   \begin{array}{cccccccc}
   1, 2 & 2, 1 & 3, 1 & 4, 1 & 5, 1 & 6, 1 \\
   1, 1 & 2, 2 & 3, 2 & 4, 2 & 5, 2 & 6, 2 \\
   1, 3 & 2, 4 & 3, 3 & 4, 3 & 5, 3 & 6, 3 \\
   1, 4 & 2, 5 & 3, 4 & 4, 4 & 5, 4 & 6, 4 \\
   1, 6 & 2, 6 & 3, 6 & 4, 6 & 5, 6 & 6, 6 \\
   \end{array}
   \]

   360 ways

   yes.

3. List the number of ways that each horse's number could come up. Using your list, which horse is most likely to win?

   horse 2 → 1-1
   horse 3 → 1-2, 2-1
   horse 4 → 2-2, 1-3, 3-1
   horse 5 → 1-4, 4-1, 3-2, 2-3
   horse 6 → 1-5, 5-1, 2-4, 4-2, 3-3
   horse 7 → 1-6, 6-1, 2-5, 5-2, 3-4, 4-3
   horse 8 → 4-4, 6-3, 3-5, 5-2, 6-1, 1-2

   horse #7

4. Compare your findings from #3 to the actual winning horse's number. Does this horse that won surprise you? Explain your answer.

   No, I was not surprised.

5. If you had the chance to play again, which horse would you choose and why?

   #7 b/c it has the best chance of winning.
Chartiers Valley High School
Lesson Plans

<table>
<thead>
<tr>
<th>Instructor: '“mc</th>
<th>Course: Integrated Math</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objective(s): The Students will...</td>
<td>Compare and order real numbers</td>
</tr>
<tr>
<td>Related Curriculum Standard:</td>
<td>2.1.11.A. Use operations (e.g., opposite, reciprocal, absolute value, raising to a power, finding roots, finding logarithms).</td>
</tr>
</tbody>
</table>
| Activities/Procedures:      | • Students will get a laptop out of the cart and as they start it up, I will go over a few examples on the Smart Board. The students will be working on Standard 1.e (Compare and order real numbers) on Study Island.  
  • As students complete the problems, I will circulate around the room and answer any questions that the students may have.  
  • As students finish, they will go on to another standard that they need to work on. This way, I can differentiate the lesson to the needs of each individual student. |
| Materials/resources:        | • Laptops  
  • Calculators  
  • Scratch Paper  
  • Smart Board |
| Assessment:                 | • Formal- Students will receive points for their Study Island work according to this scale: B- 6 Points, P- 8 Points, A- 10 Points. They can repeat the lesson until they receive their desired score.  
  • Informal- Observations of students during their seatwork |
Reflection

Because the PSSAs are quickly approaching, administration has asked that all math teachers incorporate at least one day of Study Island work into the curriculum. The students work at various paces, so it is always necessary to have other assignments ready for the students who finish early. Today, we started on standard 1.e Compare and Order Real Numbers.

As the students started up their laptops, I went over a couple examples on the board. I did one of each type that they may see on Study Island. The students like to see examples and then try on their own. As the students worked, I made sure that each student had a calculator and scratch paper to work out their answers. I always encourage the students to draw pictures and show all of their work. I also show the students how to eliminate answers on a multiple choice question. They need strong test taking skills along with strong math skills to do well on the PSSAs.

As a Curriculum Designer, I am planning instruction based upon the knowledge of students and curricular goals. I am basing my lessons on data that I have collected. Students have shown improvement based on the collected data. Since most students have improved their scores from session to session, I know that the students are learning the material. Study Island has improved the students’ basic mathematical skills. The lesson is also differentiated to meet the needs of each and every student. Because some students finish more quickly than others, I have more topics on which they can work. Each student can work on a different topic while they are working on the laptops. The technology makes it easy to differentiate.
Individual Subject Report

Program: 11th Grade - PA Standards Mastery and PSSA Preparation

Subject: Math
User: [Redacted]

Passing Level: Proficient
Starting Date: Dec 16, 2009
Report Period: Dec 16, 2009 through Apr 15, 2010

Math Benchmarks

<table>
<thead>
<tr>
<th>Date</th>
<th>Test Name</th>
<th># Sessions</th>
<th>Score</th>
<th>Time Spent</th>
<th>Correct / Total</th>
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<th>Grade</th>
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<td>01/28/10</td>
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<tr>
<td>03/08/10</td>
<td>PSSA Math Benchmark 4</td>
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<td>25%</td>
<td>4:32</td>
<td>7 / 10</td>
<td>70.0%</td>
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Study Island Topics

<table>
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<tr>
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<th>Sessions</th>
<th>Time Spent</th>
<th>Correct / Total</th>
<th>% Correct</th>
<th>Grade</th>
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<tbody>
<tr>
<td>1. Numbers &amp; Operations (Reporting Category A)</td>
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<tr>
<td>a. Square Roots - Anchor</td>
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<tr>
<td>b. Scientific Notation - Anchor</td>
<td>1</td>
<td>4:32</td>
<td>7 / 10</td>
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<tr>
<td>c. Number Lines - Anchor</td>
<td>3</td>
<td>7:03</td>
<td>10 / 13</td>
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<tr>
<td>d. GCF &amp; LCM of Monomials - Anchor</td>
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<tr>
<td>e. Compare &amp; Order Real Numbers - Anchor</td>
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<td>8:41</td>
<td>17 / 30</td>
<td>56.7%</td>
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<td>f. Rates, Work &amp; Percent Problems - Anchor</td>
<td>2</td>
<td>5:14</td>
<td>13 / 20</td>
<td>65.0%</td>
<td>P</td>
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<tr>
<td>g. Proportional Relationships - Anchor</td>
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<td>11:10</td>
<td>7 / 10</td>
<td>70.0%</td>
<td>P</td>
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<td>h. Similarity &amp; Dilations - Anchor</td>
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<td>11:13</td>
<td>12 / 23</td>
<td>52.2%</td>
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</tr>
</tbody>
</table>
1. Proportional Relationships - Anchor
   2 6:30 13/20 65.0% B

2. Simplify & Evaluate Expressions - Anchor
   1 3:22 1/10 10.0% BB

3. Algebraic Expressions - Anchor
   1 4:32 4/10 40.0% BB
   0 - - - -

4. Order of Operations - Anchor
   1 5:12 8/10 80.0% P

5. Estimate Solutions - Anchor
   1 6:22 4/10 40.0% BB
   0 - - - -

2. Measurement (Reporting Category B)

5. Measuring Angles - Anchor
   2 2:27 18/20 90.0% A

6. Perimeter, Area, Volume & Surface Area - Anchor
   3 4:38 6/14 42.9% BB
   0 - - - -

7. Change in Dimensions - Anchor
   3 6:40 8/18 44.4% BB
   0 - - - -

3. Geometry (Reporting Category C)

8. Circles - Anchor
   3 9:31 12/25 48.0% BB
   2 11:55 9/20 45.0% BB

9. Triangles & Quadrilaterals - Anchor
   1 6:01 7/10 70.0% P

10. Similar & Congruent Figures - Anchor
    1 4:16 7/10 70.0% P

11. Pythagorean Theorem - Anchor
    3 30:15 12/29 41.4% BB
    0 - - - -

4. Algebraic Concepts (Reporting Category D)

12. Patterns - Anchor
    1 3:57 8/10 80.0% P

13. Relations & Functions - Anchor
    0 - - - -

14. Graph Functions, Equations, Inequalities - Anchor
    0 - - - -

15. Linear Equation Word Problems - Anchor
    0 - - - -

16. Systems of Equations - Anchor
    0 - - - -

17. Quadratic Equations - Anchor
    0 - - - -

18. Polynomials - Anchor
    0 - - - -

19. Rate of Change Problems - Anchor
    0 - - - -

20. Linear Equations & Slope - Anchor
    0 - - - -

5. Data Analysis & Probability (Reporting Category E)

21. Plots & Diagrams - Anchor
    1 5:29 4/10 40.0% BB
    0 - - - -

22. Central Tendency - Anchor
    0 - - - -

23. Probability - Anchor
    4 15:05 14/28 50.0% BB
    0 - - - -

24. Possible Outcomes - Anchor
    4 11:02 15/32 46.9% BB

25. Possible Outcomes - Anchor
    2 3:22 12/20 60.0% B
## List Of Sessions

**Topic:** Ordering Numbers  
**User:** [Redacted]  
**Passing Goal:** 15 items and 61% correct  
**Starting Date:** Dec 16, 2009  
**Report Period:** Dec 16, 2009 through Apr 15, 2010

<table>
<thead>
<tr>
<th>Remove Checked Sessions</th>
<th>Check All</th>
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<tr>
<td>03/02/10 - 9:52 AM EST</td>
<td>Test Mode</td>
<td>2:15</td>
<td>10</td>
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<tr>
<td>Overall</td>
<td>All Modes</td>
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