**Connecticut Common Core Algebra 1 Curriculum**

**Professional Development Plan**

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| **Unit 6 Trigonometric Functions** | | |
| **Date:** | **Location:** | |
| **Presenters:** | | |
| **Schedule for the day:**  **Start time:** 1 PM  **End time:** 4 PM   * + **Opening: 1:00 - 1:15 am**   + **Session 1: 1:20 - 2:00 am**   + **Session 2: 2:05-2:45 am**   + **Session 3: 2:50-3:30 am**   + **Closing: 3:35-4:00 pm** | | |
| **Opening Session**: Overview of the Core Algebra 2 Unit 6 on Trigonometric Functions. **Power Point for Unit 6**. Distribute several 3x5 cards to each teacher so they can write suggestions for improving an activity, unit or entire curriculum to be handed in at the closing session. | | |
| **Workshop 1** | | **Presenter** |
| **Activities:** 6.1.2 What is a Radian?  6.1.3 Learn More About Radians and Arc Length  6.1.7 Special Angles  Participants “create” a radian by wrapping a string that is the length of a radius along an arc of a circle.  Ensuing activities develop the concept of radian measure as a real number, and practice with the radian measure of the special angles , and their integer multiples.  Make sure students work with circles that are not congruent. If you use transparent paper, students can lay their circles on top of each other with centers matching. Though each had a different “unit,” all central angles that have measure 1 radian are congruent. The angle “opening” for 1 radian is independent of the length selected as the unit length for the radius of the circle. | | **Equipment and Materials**   1. **Professional Development** **Power Point** for Activity 6.1.2, 6.1.3 and 6.1.7 What Is a Radian? 2. Hard copies of Activity 6.1.2, 6.1.3 and 6.1.7. for each participant. 3. Blank paper-preferably tracing paper 4. Compass, protractor, centimeter ruler.   Note: The presenter may prefer to draw various sized circles with clearly marked centers on the tracing paper before the presentation, and distribute one circle per person. This eliminates the need for compasses and saves time.   1. Two different colored writing utensils per person in addition to each participant’s pen or pencil. 2. 30 cm length string or waxed string per person 3. Calculator for basic arithmetic operations |
| **Workshop 2** | | **Presenter** |
| **Activities** 6.3.1A Part 1 Investigating Spaghetti Curves, 6.3.1A Part 2 Virtual Spaghetti, and 6.3.1B High Up on the Wheel.  In activity 6.3.1A Part 1, students use strips of uncooked spaghetti or linguini (flat so does not roll) to measure the vertical height of the point on the circle every 30° or radians, and every 45° or radians. Then they lay the lengths of spaghetti on a coordinate axis marked where the independent variable is marked off every radians. The spaghetti strips will form a sine curve.  6.3.1A Part B gives practice with a computer applet that is a virtual enactment of the Spaghetti Sine Curve activity. Repeat the activity either virtually or by hand making lengths of spaghetti that measure the horizontal distance from the y axis of the same points on the unit circle. The horizontal lengths of spaghetti will form a cosine curve.  Conclude by having students make detailed graphs of the sine and cosine functions.  By examining the vertical height of a rider on Ferris Wheels of various sizes, Activity 6.3.1B helps students sketch a sine curve while developing the concepts and vocabulary of the amplitude, period and midline. | | **Equipment and Materials**   1. **Professional Development Power Point** for Activity 6.3.1 Graphing the sine function. 2. A hard copy of Activities 6.3.1A Part 1, Part 2 and 6.3.1B per person. If possible, enlarge the activity sheet for Activity 6.3.1A Part 1 to 11”x17”. 3. 5-6 strips of uncooked spaghetti 4. Double sided tape 5. Graphing Calculator 6. A computer to show a video of a Ferris Wheel in motion, preferably one that the students know from a local amusement park or a famous one like the first Ferris Wheel or the London Eye. |
| **Workshop 3** | |  |
| **Performance Task for Unit 6**  Discuss the generic performance task, Find Your Own Trig Function. The performance task directs students to research or collect data from a phenomenon that can be modelled approximately by a sinusoidal or tangent function. Using the trigonometric model they have developed, students predict and/or analyze the behavior of the phenomenon.  Teachers need to discuss when the PF should be assigned, how much class time, how much out of class time or library time. A suggested rubric is provided for each task but teachers may want to consider additional categories that should be included. Having student presentations or at least a bulletin board posting of the final product for say the PFs in units 1 and 3 are just a few discussion suggestions. Teachers who have used performance tasks should be encouraged to share their observations, ideas.  Then examine the biorhythm performance task. Have teachers work their way in groups through a few pages at least.  The task of grading is great. Suggestions for modifying a PF so the evaluation of the PF is reasonable for the teacher.  Note: Unit 6 also has a music PF.  Other Unit Performance Tasks can be studied in addition to or in lieu of the unit 6 ones. Unit 5 one was mentioned in the morning workshop briefly. You may want to discuss it further. The closing power point has slides for the performance tasks for units 1, 3 and 5. | | **Equipment and Materials**   1. A hard copy of the generic performancetask and the biorhythm performance task per person 2. Partition the participants into 3 groups and provide each group with a hard copy of both of the following suggestions for a performance task: 3. biorhythms, 4. generic where students select. 5. Computer with internet for research 6. Ruler and paper 7. Graphing Calculator 8. If a Performance Task from another unit is selected have copies of it for participants and needed equipment. 9. Slides from the closing power point may be helpful for the presenter and teachers to focus part of the discussion. |
| **Closing Session** Participants will hand in any suggestions on their 3x5 cards. One presenter can glance thru the cards while the other presenters do an overview for the assessments in Unit 6, particularly the Performance Task. Emphasis on the value of and techniques for doing a performance task for each unit. **See Closing Power Point** which includes slides with performance tasks from units 1, 3 and 5 which were mentioned briefly in other workshops.  Ask the teachers for ideas about:   * implementing the performance task, and * grading the performance task. Discuss possible rubrics.   Point out that students are expected to be able to work and explore concepts fairly independently by Unit 6. Students need the practice doing the Performance Tasks in Units 1-5 for this to happen. Note that the performance task is a significant way to provide students the opportunity to develop the 8 Core Mathematical Practices.  ##Next, the other presenter who read the cards can summarize the results, and lead a discussion about ideas from the cards. Take the opportunity to emphasize that the teacher makes educational decisions all the time about what it best for their students. Teachers may change the order of activities, add to activities, or remove sections from activities. The curriculum is available as a word document to facilitate modifications. | | |
| **Additional Comments--** ##if the performance task discussion is in full swing can save this part of the discussion for tomorrow. | | |