

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

Date: \_\_\_\_\_

Block: \_\_\_\_\_

# Graphs of Sine & Cosine Functions

## Dynamics of Trigonometry

Working with the members of your group, solve your assigned problem. Show all necessary work and explain your answers thoroughly. Use algebraic reasoning to solve the problem unless otherwise noted. When all members of the group agree on the solution, create a video using the *Show Me* app on your iPad. Each group should create one video with each member participating. Each group member should have his or her own work for the problem. Your video should contain: the problem, all necessary work, the answer to the questions, and a thorough explanation. You will be graded according to the attached rubric. This will count as half a quiz grade. When you are finished, solve the other problems on this sheet on a separate sheet of paper.

- The average temperature in Monroe varies according to the sinusoidal function  $y = -30 \cos\left(\frac{\pi}{6}x\right) + 55$  where  $y$  is the temperature in  $^{\circ}\text{F}$  and  $x$  is the time in months where  $x = 1$  represents January.
  - What is the average temperature of each month?
  - What are the maximum and minimum temperatures in Monroe? When do they occur?
  - Based on what you know about temperature and the months of the year, does this graph make sense? Explain your answer thoroughly.
- The average annual snowfall in a certain region is modeled by the function  $S(t) = 20 + 10 \sin\left(\frac{\pi}{7}t\right)$  where  $S$  represents the annual snowfall, in inches, and  $t$  represents the number of years since 2000.
  - What is the average amount of snowfall in each of the years from 2000 to 2014?
  - According to this model, what is the minimum annual snowfall, in inches, for this region?
  - In which year(s) between 2000 and now did the minimum amount of snowfall occur?
- A company that produces snowboards, which are seasonal products, forecasts monthly sales for 1 year to be  $S = 74.50 + 43.75 \cos\frac{\pi}{6}t$  where  $S$  is the sales in thousands of units and  $t$  is the time in months, with  $t = 1$  corresponding to January.
  - In what month will the company sell the most amount of snowboards? How many snowboards do they predict to sell that month?
  - In what month will the company sell the least amount of snowboards? How many snowboards do they predict to sell that month?

## Dynamics of Trigonometry – Graphs of Sine & Cosine Functions

Names: \_\_\_\_\_

<b>Graphing Requirements</b>	<b>Not Completed</b>	<b>Minimal Completion</b>	<b>Partial Completion</b>	<b>100% Completion</b>
The problem is written in the presentation and read aloud.	0 points	1 point	3 points	5 points
The process in solving the problem is clearly identified and thorough. The work is legible and described in detail on the video.	0 points	10 points	20 points	30 points
All questions are answered with a clear and thorough explanation.	0 points	10 points	20 points	30 points
The final presentation is neatly organized with all members of the group contributing to the final product and with accurate results.	0 points	5 points	10 points	15 points
Each member of the group hands in their own work on a separate sheet of paper. The work contains correct mathematical thinking. All work necessary to solve the problem is included.	0 points	3 point	6 points	10 points
Creativity/effort for the video.	0 points	3 point	6 points	10 points

Grade: \_\_\_\_\_

Comments:

## Show Me Directions

1. Open the Show Me app on your iPad and create your video lesson. If you have never used Show Me before, you can watch the short tutorial which pops up as soon as you open the app. If you are familiar with Show Me, proceed to step 2.
2. To ensure you can record, go to Settings on your iPad. Select Privacy from the left menu, then microphone from the menu at the right. Once you are at microphone, swipe the button right on the Show Me row. If the microphone is active, the selection will be green.
3. To begin recording, tap the red button which is located in the middle of the top row. You can pause your recording at any time during the presentation. You can write on the Show Me whiteboard with the microphone off or the microphone on.
4. Note—once you record the voice, it cannot be edited. The written portion can be edited using the erasure function on the top row (or the undo button) but written work can only be edited without voice recording. *The voice recording can be recorded **after** you have completed all of your written work.*
5. You may include images relevant to the context of the problem. Note from the attached rubric there is a creativity portion to your grade.
6. Once you complete the written and recorded presentation, it will prompt you to either log in or create an account. Once your video has been saved and you are logged in, find your video under “My ShowMes” which is located at the top of the page.
7. Click the top right corner of the video (settings button), select share, then email. Please include all group member names in the subject section of the email. Your email should be sent to me at: [peter.ruckdeschel@monroe.k12.nj.us](mailto:peter.ruckdeschel@monroe.k12.nj.us).