The Scholars' Academy

An Accelerated College Preparatory School for Grades 6-12
27Q323, A Teaching and Learning Organization
"Technology Today, Smarter Tomorrow:
Removing Time and Place from Teaching and Learning"
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Welcome to GEOMETRY
Summer Performance Based Task

Due Date: September 13th, 2013

Focus Question: What is the least amount of aluminum that can be used to design a soda can?

Key Common Core Standards:

This task asks students to select and apply mathematical content from across the grades, including the content standards:

H.G-GMD: Explain volume formulas and use them to solve problems

H.M: Model with Mathematics

MP1: Make sense of problems and persevere in solving them

MP3: Construct viable arguments and critique the reasoning of others

MP6: Attend to precision

MP7: Look for and make use of structure

Task:

Complete an investigation of volume and surface area of a cylinder, and design a cylindrical drink can that uses the least aluminum for a given volume of drink.

The Fresha Drink Company is marketing a new soft drink.

The drink will be sold in a 'Fun Size' cylindrical can which holds 200 cm^3.

Here are two suggestions for the radius of the cylindrical can.

Mark

I'm designing a can with radius 2 cm.

My can has a radius of 5 cm.

Linda

Answer the questions below on a separate sheet of paper. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams and drawings. A correct numerical answer with no supporting work, will not receive credit.

1. The volume of the can is 200 cubic centimeters. Using the suggested radii from Mark and Linda, determine the height of each can. Show all work.

2. Are the dimensions of the cans suitable? Explain your reasoning.

_____

_____

3. Find the surface area of the two cans. Show all work.

4. In order to keep costs low, the Fresha Drink Company wants to sell the drink in cylindrical cans that use the smallest amount of aluminum.
   Find the appropriate radius and height of a can that holds $200cm^3$ and uses the smallest amount of aluminum. Show all work/trials including formulas. If necessary, round answers to the nearest 10th. (You may find it helpful to use graph paper.)

5. After analyzing the dimensions of the soda cans and determining which soda can would be best to keep costs low, you will design this can. Begin by creating a 2-dimensional illustration (blue print) of your can including its dimensions. You will then make a 3 dimensional model. You may use any materials necessary to accurately create your soda can.

6. Write one paragraph describing how you analyzed the dimensions of the can and determined the size that would be best to keep cost low.

GEOMETRY SUMMER HW RUBRIC

NAME _____

GEOMETRY SECTION _____

1. Student gives correct answers to questions # 1 and 2. Shows correct work such as: substitutes in the formula to find the height of the can with radii of 2 cm and 5 cm. Provides valid reasoning as towards with can is suitable to create or not.	_____/4 points
2. Gives correct answers for question #3. Uses appropriate formulas to find the surface areas of cylinders with radii of 2 cm and 5 cm.	_____/2 points
3. Question #4: Decides to find the surface area of other cylinders. Correctly finds the height and surface area of the cylinders with radii between 2 cm and 5 cm. Answers expressed to nearest tenth of a centimeter. States the size of the most appropriate can to create.	_____/4 points
4.Three dimensional design and object. Accurate dimensions stated on blue prints and portrayed on object.	_____/5 points
5.Written paragraph describing reasoning and analysis of information to determine dimensions of can which will require the least amount of aluminum.	_____/5 points
Total points:	_____/20 points