TI-*nspire*™

Minimizing Surface Area of a Cylinder
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Activity overview
Students will minimize the surface area of a cylinder by collecting data from a geometric construction, estimate the minimum radius from a scatter plot, and calculate the actual radius using calculus and the CAS features of Nspire.

Concepts
Combining functions
Solving optimization problem using calculus

Teacher preparation
- o *Students need prior knowledge on solving equations in terms of a variable and calculating first derivatives.*

Classroom management tips
Have students work in pairs to facilitate communication and the comparison of solutions.

TI-Nspire Applications
Cylinder Area – Student.tns
Cylinder Area – Teacher.tns

Step-by-step directions
- o Copy *Cylinder Area – Student.tns* to Nspire handheld units
- o Make copies of student sheets *Cyliinder Area – Student.pdf*
- o Distribute student activity sheets and Nspire handheld units.
- o Students work in pairs on the investigation
- o Consolidate student understanding with a discussion afterwards.

Assessment and evaluation
- *During the activity assess students on their use of the mathematical processes **representing, connecting** and **reasoning and proving***
- *This activity could be used as a summative evaluation*

Activity extensions
- *The dimensions of the can with minimum surface area have nearly equal diameter and height. Drink cans usually have a larger height than diameter. Why would companies use these dimensions even though they cost more to create?*
- *If the cost of materials per cm^2 for the top and bottom of the can were twice the cost per cm^2 for the lateral surface how would the dimensions change for the cylinder with minimum surface area?*