

AP Calculus Pyramid Box Activity

Determine the ideal base and height of a pyramid in order for the pyramid to have greatest volume

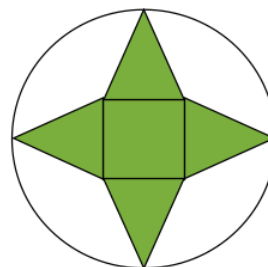
Material Circular sheet of paper of radius 10cm, Scissors, Glue, Rice, Compass, and Graduated cylinders

Two students will work on Task 1, and two students will work on Task 2.

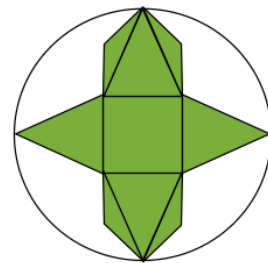
Task 1

For Task 1, agree with your partner on *different sizes of base* so that each one of you has a different pyramid. No calculations, calculators or computation allowed.

Cut the net of a square-base pyramid in the sheet of paper.
Constraint: the radius of the circle is 10 cm.



Actually, don't forget to include flaps!



Glue carefully. Then cut an opening at the top.

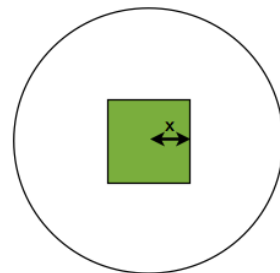
Fill your pyramid with rice.



Empty the rice in the graduated cylinder and write down the volume you measured with the rice.

Task 2

This is about Algebra and Calculus!



1. Write a function for the volume of the pyramid in terms of x (“half-base” as shown in the figure)
2. Calculate the “real” volume of the 2 pyramids that are being created by your group by using their measurement for the base.
3. Compare this “real volume” with the measurements they obtained with rice. Comment on the comparison.
4. Use Calculus to determine the optimum dimensions of a pyramid. Show all work algebraically.
5. Copy your worked solution using MathType.

End product: iBook chapter

- Remember that the end product is a new chapter in your iBook.
- During the activity, be sure to take photos, videos, etc. to use for your iBook.
- Combined with the Rolling Ball Activity, this will count as a project grade.
- Read the rubric carefully.