

Calculus BC

Section 3.7 - Optimization Problems

Obj: -To solve optimization problems.

Guideline to solve optimization problems

- Identify all given quantities and all quantities to be determined. Sketch if possible.
- Write a primary equation for the quantity to be maximized / minimized.
- Reduce primary equation to one with a single variable. May need to use secondary equations relating the independent variables of the primary equation.
- Differentiate to determine max/min value. Also consider the domain of the function.

1. What is the largest possible area for a right triangle whose hypotenuse is 5 cm long?

-Given quantities

-Quantity to be maximized

-Sketch

-Primary equation for the quantity to be maximized

-Reduce to single variable using secondary equation.

-Differentiate to determine max/min value.

-Answer question

2. An open top box is to be made by cutting congruent squares from the corners of a 12 x 18 inches sheet and bending up the sides. How large should the squares be to maximize the volume of the box?

3. Design a 1 liter closed top cylinder which requires the least material (assume there is no waste in cutting and ignore thickness)