

# WINDOW ARCHITECTURE

**Goal:** In this project your group is charged with the responsibility of designing the windows for a new building in downtown Atlanta. You will determine the optimum dimensions required for maximum light, approximate the total cost of the glass required, including error information, and write a final proposal/bid to the architects in hopes of obtaining the job for your company.

## Names and Primary Responsibilities of Group Members:

**Accountant:**

**Geometer/Designer:**

**Recorder/Writer:**

**Technology Operator/Algebraist:**

**Design Stage:** Windows are designed with both aesthetic and practical issues in mind. Together, decide what type of building you are designing windows for. Describe it here including the number of windows it will have and the type of glass you will use. (See price list from Amcoa Glass Company, Boca Raton, Florida.)

1. Design your window. Show a well labeled sketch here. In your design you must have two independent variable dimensions,  $x$  and  $y$  as well as a constraining relationship between  $x$  and  $y$ . If you choose only one variable dimension  $x$  then decide on a closed interval of acceptable values for  $x$ .

2. Determine, using calculus, which dimensions will provide optimum light. Provide well labeled sketch of the final design.

**Cost Analysis Stage:** Now that you've designed a window that is both aesthetically pleasing as well as appropriate to the purpose of the building, your team will want to analyze mathematically the cost of making these windows.

1. Write a function which gives the total cost of constructing the windows for this building as a function of the variable,  $x$ . Compute an approximation of the total cost as determined by your optimal value of  $x$ .
  
2. Use differentials to analyze possible error in the total cost approximation and obtain a range of possible values for the actual cost. Use this to determine what price you will charge the owners of the building for the glass needed.

**Bidding Stage:** On a separate sheet, write a proposal including, but not limited to, the window design, the suggested dimensions of the windows, the total price of the glass and a justification of the budget proposed.

The following data has been provided by Amcoa Glass Inc. - Boca Raton.

<b>Type</b>	<b>Cost per Square Foot</b>
Wireglass	12.50
Black Glass	18.50
Rain Glass	5.56
Peach Mirror	25.00
Crackled	45.00

<b>Shape (3/4" flat glass)</b>	<b>Cost per Square Foot</b>
Square	13.00
Circle	14.60
Oval	16.00
Pattern	16.00