



## ICE - Optimization

**One of the things that you might have been wondering about is the practical uses of derivatives of polynomials. In this activity you will use derivatives of polynomials together with your knowledge of maximum and minimum points. Figures 1 and 2 (below) show a cutting plan for a very simple box. The box is to be made from a 6 inch square of cardboard by cutting squares from the corners and then folding the sides up.**

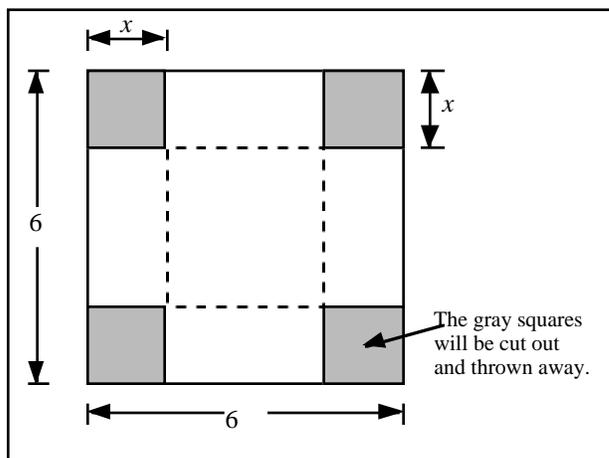


Figure 1: Cutting plan for constructing box from six inch square of cardboard.

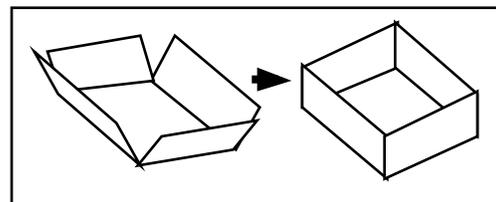


Figure 2: As soon as the gray squares are removed, the sides are folded up to form the box.

- **Use the information in Diagram 1 and Diagram 2 to create a function that gives the volume of the completed box.**
- **Find the derivative of your volume function and graph the equation that you obtain on your calculator. How can you use the graph that your calculator produces to locate the maximum and minimum values of volume?**
- **How can you use the graph produced by your calculator to decide which of the points gives maximum volume and which of the points gives minimum volume?**
- **What is the maximum volume of the box in cubic inches?**