1. A rectangular box without a lid is to be made from a 24 × 36 inch piece of cardboard by removing a square from each corner and folding up the resulting flaps along the dotted lines. Find the size of the cutouts that maximizes the box’s volume.

![Diagram of cardboard with cutouts](image1)

2. A rectangular swimming pool is to be built with an area of 1800 square feet. The pool will be surrounded by a patio of width 5 feet on each side and 10 feet at each end. Find the dimensions of the pool that minimize the total area of the property required.

![Diagram of pool with patio](image2)

3. A rectangle is inscribed in a semicircle of radius 1. Find the dimensions that maximize the area of the rectangle.

![Diagram of semicircle with rectangle](image3)