Calculus Classwork on *Optimization*

1) A farmer has 400 yards of fencing and wishes to fence three sides of a rectangular field (the fourth side is along an existing stone wall, and needs no additional fencing). Find the dimensions of the rectangular field of largest area that can be fenced.

2) A metal box (without a top) is to be constructed from a square sheet of metal that is 20 cm on a side by cutting square pieces of the same size from the corners of the sheet and then folding up the sides. Find the dimensions of the box with the largest volume that can be constructed in this manner.

3) A rectangular field adjacent to a river is to be enclosed. Fencing along the river costs $5 per meter, and the fencing for the other sides costs $3 per meter. The area of the field is to be 1200 square meters. Find the dimensions of the field that is the least expensive to enclose.