1. Suppose you have 1000 linear feet of fencing, and you want to fence in a rectangular field next to a long straight building. Since the building is there, you can essentially use it as a piece of fence. That is, you only need to fence in three sides. What is the maximum area you can enclose? What are the dimensions of your fence?

2. Same problem, but now you have $B$ linear feet of fencing (instead of 1000). What is the maximum area you can enclose? What dimensions give you that maximum area?

3. Shown here is a graph of the function $f(x) = 2 - x^3$.

4. Suppose $a$ and $b$ are positive constants. What are the dimensions of the largest rectangle that can be inscribed inside the graph of $f(x) = a - bx^3$? What is the area of that rectangle?

5. Suppose you need to enclose a 1000-square-foot rectangular area, subdivided into eight equal parts, as shown.

6. Suppose you need to enclose a $Q$-square-foot rectangular area, subdivided into $mn$ equal parts, arranged into an $m \times n$ grid. For example, here is what it would look like with $m = 7$ and $n = 20$.

What is the minimum amount of fencing you can use to accomplish the task? What will be the dimensions of each of the small rectangles?