There have been some changes in the situation at the stadium in problem 2.6: 27. The governing board has asked for profitability information.

It is still the case that, when tickets cost $10, they have 27,000 folks show up for a game. But, owing to straightened economic times, lowering the ticket price by $1 only raises attendance by 1,800.

It costs $6,000 to open the stadium for a game. And it costs about $3 per spectator for cleanup, restrooms, and liability insurance.

(a) Write down a formula for \( y \), the number of tickets sold, in terms of \( x \), the price of one ticket.

(b) Express the total stadium operating costs in terms of the number of spectators.

(c) Express the total stadium operating costs in terms of the price of a single ticket.

(d) Write down a formula for the total profit on a game at this stadium.

(e) Determine the optimal ticket price, that is, the ticket price which maximizes the total profit for a game. Is this a ticket price they can actually charge?

(f) Write a brief paragraph for the board of directors explaining your optimal-ticket-price result in their terms. They don’t want to know about all the algebra you had to hack through, but they will have questions. Anticipate their questions in your paragraph.

A rancher wants to build a pen setup like the one in the figure in problem 2.6:24. It turns out that the outer-side fencing is $18/foot. This kind of fencing must also be used on the center divider. The other two dividers are to be built with fencing which costs $10/foot. The rancher has $43,475 to spend on fencing. Determine the dimensions of the largest plot that can be fenced within these specifications. What is the area of this largest plot?