4.5 Optimization II

Dr. Julia Arnold

using Tan’s 5th edition Applied Calculus for the managerial , life, and social sciences text

Suppose you want to make a rectangular garden but you can
only afford to buy 50 feet of fencing. What would be the largest possible rectangle that you could have.

This problem is different from the ones in the last section in that you want to optimize one thing (find max or min) but you have been given a constraint (limited amount of fencing in this case).

We need to consider two formulas:
one for the perimeter of the rectangle (which represents the fencing) and one for the area of the rectangle (which represents the largest size garden.

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The formula for the area which we would like to be a maximum is
$A = lw$
The formula for the perimeter which is the constraint is
$50 = 2l + 2w$

Since the Area formula is the one for which we seek a maximum, it is the one that we need to find the derivative. But, it has two variables l and w. That's a problem.