OPTIMIZATION

Math 130 - Essentials of Calculus

7 April 2021

STARTING EXAMPLE

EXAMPLE

A farmer has 2400*ft of fencing and wants to fence off a rectangular field that borders a straight river. She needs no fence along the river. What are the dimensions of the field that has the largest area?*

Procedures for Solving Optimization Problems

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4. *Determine the feasible domain of the primary equation. That is, determine the values for which the stated problem makes sense.*

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4. *Determine the feasible domain of the primary equation. That is, determine the values for which the stated problem makes sense.*
5. *Determine the desired maximum or minimum value using calculus.*

Now You Try It!

Example

Find the dimensions of a rectangle with perimeter 100m whose area is as large as possible.

Example without a Feasible Domain

Example

Find the dimensions of a rectangle with area $1000m^2$ whose perimeter is as small as possible.

Now You Try It!

Example

A box with a square base and open top must have a volume of $32,000 cm^3$. Find the dimensions of the box that minimize the amount of material used.

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1. *Find two numbers whose difference is* 100 *and whose product is a maximum.*
2. *Find two positive numbers whose product is* 100 *and whose sum is a minimum.*
3. *Find a positive number such that the sum of the number and its reciprocal is as small as possible.*