

Minimizing perimeter

At the end of winter, a farmer needs to install a fence around the field in which her cows are going to spend the summer. In order for the cows to have enough space, the field should have a surface of 4 km^2 . Out of simplicity, the field has a rectangular shape. In order to save time and money when installing the fence, the farmer wants her field to have the smallest possible perimeter.

1. What are we trying to optimize (in that case minimize)?
2. Draw a sketch of the situation and assign variables to the various lengths.
3. Write down the equation of the perimeter of the field.

Then, using that the area of the field is 4 km^2 , find a relation between the two variables. Use this relation to rewrite the perimeter of the field as a function of a single variable.

4. Find the minimum value for the perimeter (using differentiation).

Identify the steps you used to solve this exercise.