Oil-pipeline problem

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Abstract

We present a general solution to a problem from Briggs and Cochran's *Calculus*.

The scenario: A company wants to build a pipeline across a river, but the materials required to build under the river cost R dollars per mile, while the materials required to build along the shore cost S dollars per mile. Find the least amount of money the company will have to pay in order to build a pipeline from their location to their destination across the river.

Our first step towards a general solution to this is to label points on the xy-plane accordingly, and determine the quantities which are allowed to vary. After a moments thoughts, it is easy to see that Fig. 1 depicts the situation accurately

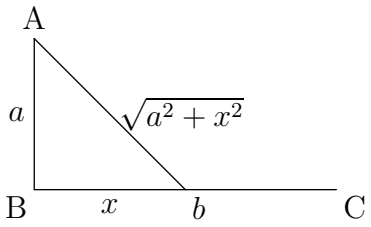

Figure 1: A picture of the general situation, with the relevant points and quantities labeled.