Practical Data Science
(Optimization for Non-ML Problems)

Problem 1: Find the least amount of fencing

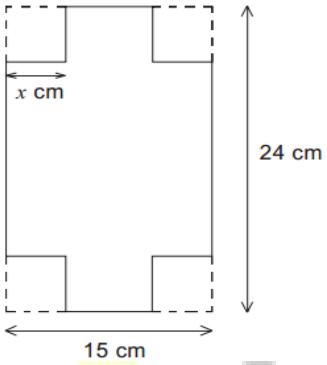
A rectangular paddock is having an area of 50 m^2. One side of the rectangle is straight wall as shown below and the remaining three sides are to be made from wire fencing. Do the following:

a. Find the expression for required fencing
b. Find the least amount of fencing required using calculus approach.

Problem 2: Design maximum volume open rectangular box

The diagram below shows a 24cm by 15cm sheet of cupboard from which a square of side x cm has been removed from each corner. The cardboard is then folded to form an open rectangular box of depth x cm and volume of v cm3. Do the following:

a. Find the expression for volume
b. Find value of x for which volume is maximum using calculus approach



Problem 3: Design of optimal sized petrol tank

An emergency petrol tank is designed to carry 1 gallon of petrol(4546 cm^3). Its shape can be considered to be cuboid as shown below. The base of the cuboid is a rectangle with the length double the width. Do the following:

a. Find the expression for surface area of tank
b. Find the dimensions of tanks that minimizes the required surface area using calculus approach

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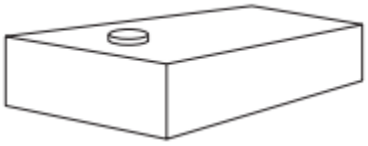

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