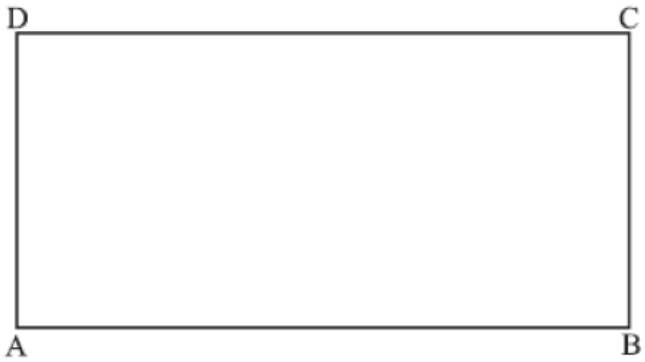
Optimization

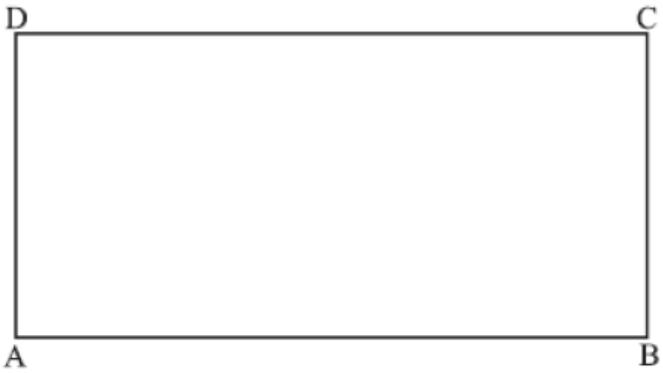
Max Or Min
Volume Or Area
First derivative = 0

1. A farmer wants to make a fencing with total length 40 m. The length of AB is x m and CB is y m.



(a) Write an equation to show the above information.
(b) Express Area (A) in terms of x.
(c) Find the maximum area of the enclosure.

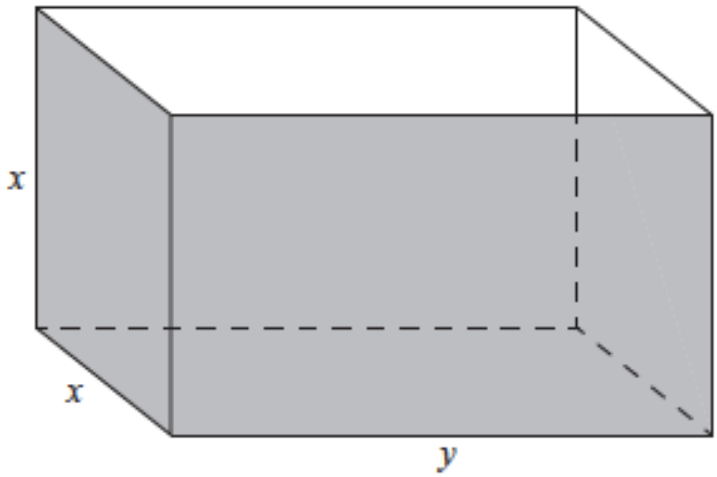
2. A farmer wants to make a fencing with total length 100 m. The length of AB is x m and CB is y m.



(a) Write an equation to show the above information.
(b) Express Area (A) in terms of x.
(c) Find the maximum area of the enclosure.

Paper 1

1. Fred makes an open metal container in the shape of cuboid, as shown in the following diagram.



The container has height x m, width x m and length y m. The volume is 36 m^3.
Let A(x) be the outside surface area of the container.

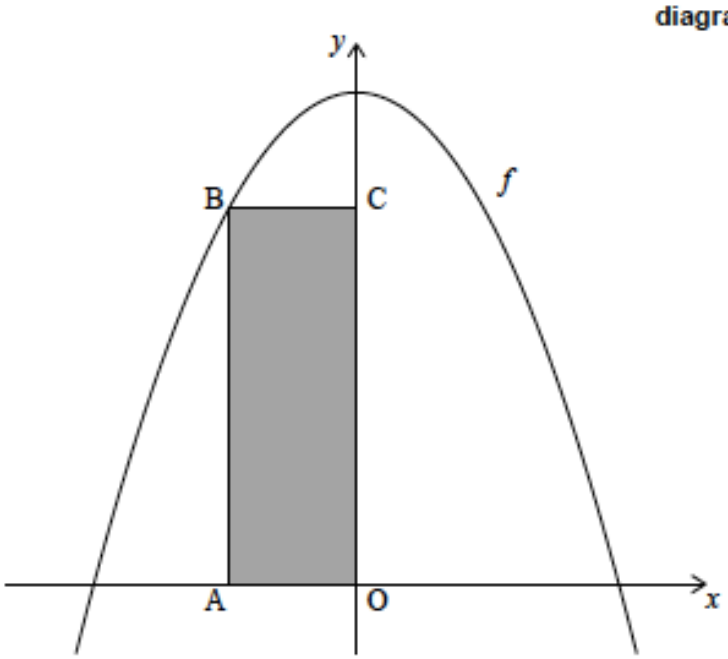
(a) Show that A(x) = $\frac{108}{x} + 2x^2$.

(b) Find $A'(x)$.

(c) Given that the outside surface area is a minimum, find the height of the container.

(d) Fred paints the outside of the container. A tin of paint covers a surface area of 10m^2 and cost \$20. Find the total cost of the tins needed to paint the container.

2. Let $f(x) = 15 - x^2$, for $x \in \mathbb{R}$. The following diagram shows part of the graph of f and the rectangle OABC, where A is on the negative x-axis, B is on the graph of f, and C is on the y-axis.



Find the x-coordinate of A that gives the maximum area of OABC.