

Classic Calculus Optimization Problems

Lesson 292 | Calculus AB | Optimization

<https://www.youtube.com/watch?v=yZnaUnDeTQ0>

Original practice aligned to the saved video title.

Name: _____ Date: _____ Show your reasoning.

01

A farmer has 260 m of fencing for three sides of a rectangle beside a straight river. Maximize the area; state dimensions.

02

A farmer has 88 m of fencing for three sides of a rectangle beside a straight river. Maximize the area; state dimensions.

03

A farmer has 112 m of fencing for three sides of a rectangle beside a straight river. Maximize the area; state dimensions.

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04

A farmer has 90 m of fencing for three sides of a rectangle beside a straight river. Maximize the area; state dimensions.

05

A farmer has 40 m of fencing for three sides of a rectangle beside a straight river. Maximize the area; state dimensions.

06

A farmer has 198 m of fencing for three sides of a rectangle beside a straight river. Maximize the area; state dimensions.

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01

A farmer has 260 m of fencing for three sides of a rectangle beside a straight river. Maximize the area; state dimensions.

Let widths be w and length $L=260-2w$. Area $A(w)=260w-2w^2$, $0<w<130$. $A'=260-4w=0$ gives $w=65$, $L=130$. $A''=-4<0$; maximum area 8450 m^2 .

02

A farmer has 88 m of fencing for three sides of a rectangle beside a straight river. Maximize the area; state dimensions.

Let widths be w and length $L=88-2w$. Area $A(w)=88w-2w^2$, $0<w<44$. $A'=88-4w=0$ gives $w=22$, $L=44$. $A''=-4<0$; maximum area 968 m^2 .

03

A farmer has 112 m of fencing for three sides of a rectangle beside a straight river. Maximize the area; state dimensions.

Let widths be w and length $L=112-2w$. Area $A(w)=112w-2w^2$, $0<w<56$. $A'=112-4w=0$ gives $w=28$, $L=56$. $A''=-4<0$; maximum area 1568 m^2 .

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04

A farmer has 90 m of fencing for three sides of a rectangle beside a straight river. Maximize the area; state dimensions.

Let widths be w and length $L=90-2w$. Area $A(w)=90w-2w^2$, $0<w<45$. $A'=90-4w=0$ gives $w=45/2$, $L=45$. $A''=-4<0$; maximum area $2025/2 \text{ m}^2$.

05

A farmer has 40 m of fencing for three sides of a rectangle beside a straight river. Maximize the area; state dimensions.

Let widths be w and length $L=40-2w$. Area $A(w)=40w-2w^2$, $0<w<20$. $A'=40-4w=0$ gives $w=10$, $L=20$. $A''=-4<0$; maximum area 200 m^2 .

06

A farmer has 198 m of fencing for three sides of a rectangle beside a straight river. Maximize the area; state dimensions.

Let widths be w and length $L=198-2w$. Area $A(w)=198w-2w^2$, $0<w<99$. $A'=198-4w=0$ gives $w=99/2$, $L=99$. $A''=-4<0$; maximum area $9801/2 \text{ m}^2$.