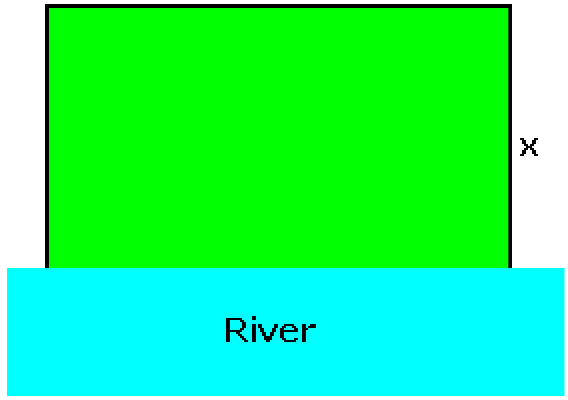
MATC9 Ch2.5 Key Concepts 2 Maximizing the Area of a Rectangle (Three Sides) Worked Example

Example: What is the minimum amount of fencing needed to enclose an area of 512 m^2, if one side is along a river and needs no fence?



Solution: The maximum area enclosed occurs when the length is twice the width. Let the width be x and the length be $2x$. The area is $x \times 2x = 2x^2$. Therefore,

$$\begin{aligned} 2x^2 &= 512 \\ x^2 &= 256 \\ x &= 16 \text{ m} \end{aligned}$$

The amount of fencing needed is $16 + 16 + 32 = 64$ m.

Practice:

1. What is the minimum amount of fencing required to enclose an area of 5000 m^2, if fencing is only required on three sides?

2. What is the minimum amount of fencing required to enclose an area of 1 km^2, if fencing is only required on three sides?

Answers: 1. 200 m   2. 2.83 km