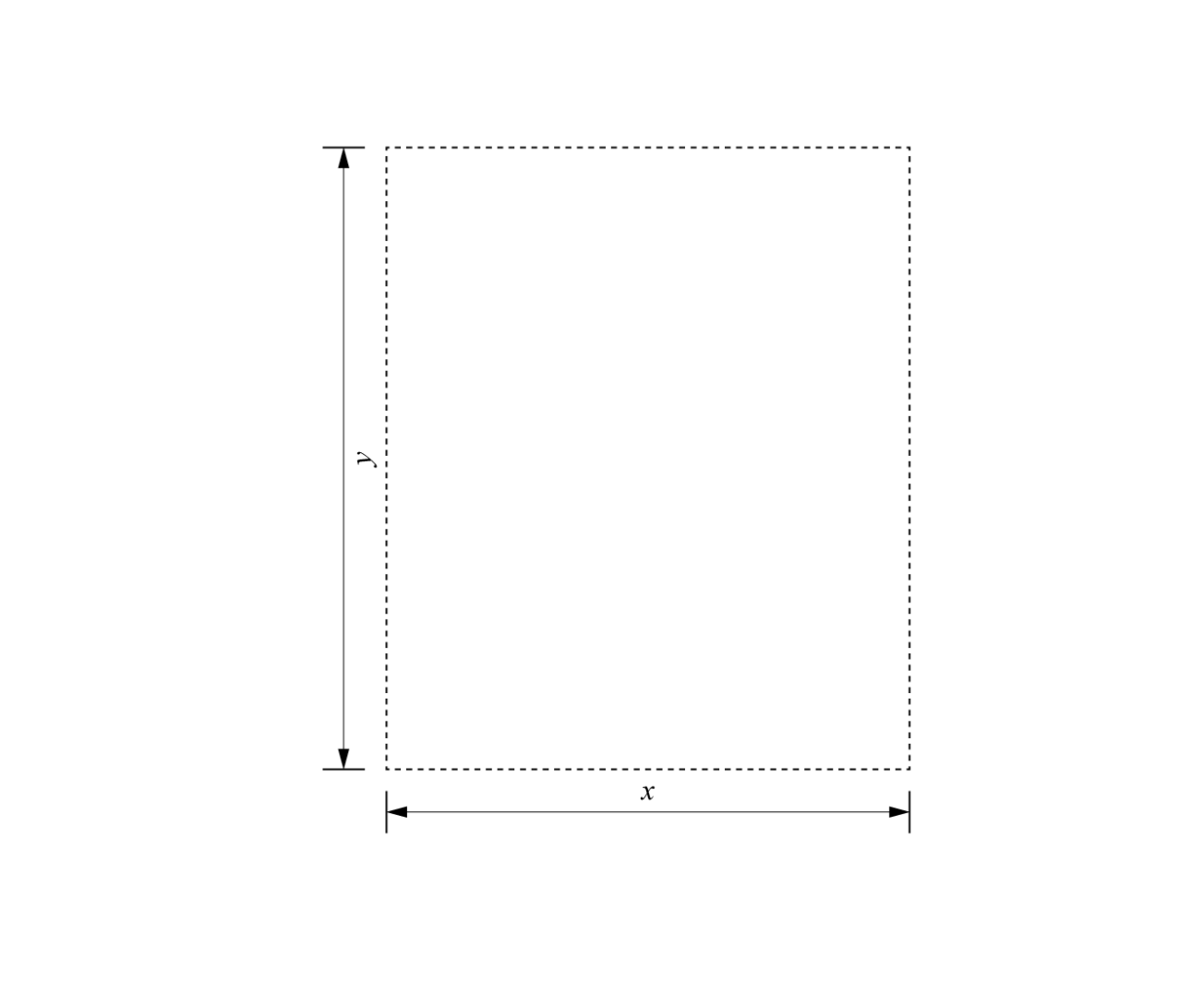
**Consolidation: answers**

# Practice question 1

**Step 1: Define the variables.**

Let represent the horizontal side and *y* represent the vertical side of the compound diagram.



The total area of the site is 8000 m2, so:

Express in terms of :

**Step 2: Write an equation for the cost of fencing in terms of .**

The vertical sides (length ) cost £20 per metre. The horizontal sides (length ) cost £30 per metre. So, the total cost of fencing is:

Substitute the formula for into the cost equation:

**Step 3: Differentiate to minimise .**  
Differentiate *C* with respect to :

Now we need to find . Set the derivative equal to 0:

3

m

**Step 4: Check it’s a minimum.**

Find the second derivative:

Substitute

The second derivative is greater than 0, so this is a minimum.

**Step 5: Find the dimensions and the total cost.**

Substitute into the formula for :

Calculate the total cost:

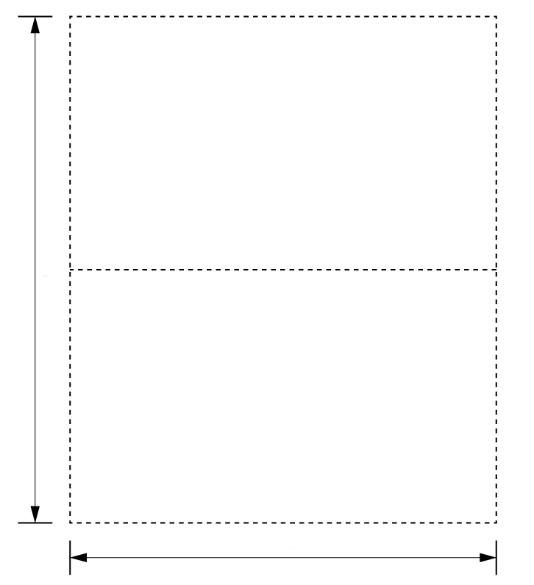
Substitute and into the cost equation:

The minimised cost of the fencing is £8763.20.

The dimensions of the compound are length 73.03 metres and width 109.54 metres.

# Practice question 2

Let represent the vertical side and *x* represent the horizontal side of the compound.



*y*

*x*

**Step 1: Define the variables.**

The total area of the site is 9000 m2, so:

Express in terms of :

**Step 2: Write an equation for the total length of fencing in terms of .**

There are 2 sides of length , 2 sides of width and 1 dividing fence along .

The total length of fencing for the site is:

Substitute into the length equation:

**Step 3: Differentiate to minimise .**

Differentiate with respect to .

Now we need to find . Set the derivative equal to 0:

m

**Step 4: Check it’s a minimum.**

Find the second derivative:

Substitute

The second derivative is greater than 0, so this is a minimum.

**Step 5: Find the final dimensions:**

Substitute into the formula for :

m

Calculate the total fencing length:

m

The dimensions of the compound to minimise the total fencing length are height 116.19 metres and width 464.76 metres.