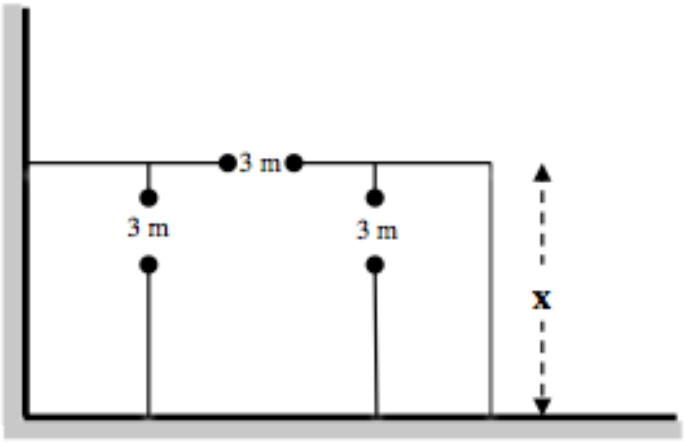
Question 6 (Approximately 7 minutes) 2013 exam

A set of three small paddocks is to be constructed in the corner of an existing fenced paddock as shown in the diagram below.



Notes:

- There is enough fencing material to construct 72 metres of fence.
- There are three gaps of 3 metres.

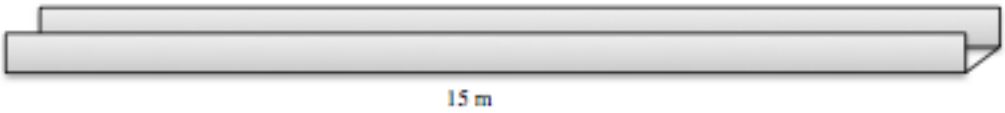
(a) Show that the total area of the three small paddocks can be calculated using the formula:

$$A = -3x^2 + 81x ,$$

where A is the total area of the three small paddocks (m^2) and x is the side length of the paddocks (m) as shown.

Question 5 (Approximately 8 minutes) 2012 Exam

A gutter (open-topped, open-ended box) is to be constructed using a **15 m x 0.4 m** flat strip of metal.



(a) Show that the volume of the gutter can be calculated using the formula:

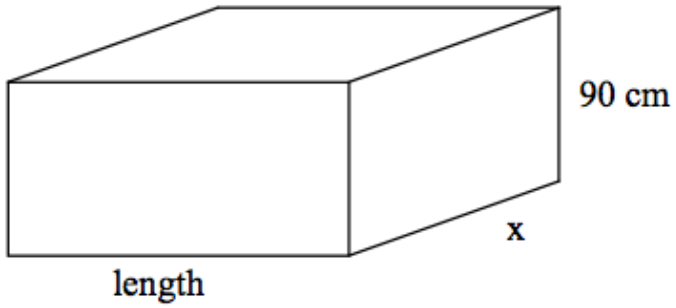
$$V = 6x - 30x^2$$

where V is volume of the gutter **in cubic metres** and x is height of the gutter **in metres**.

Question 5 (Approximately 8 minutes) 2010 Exam

A furniture removal company asks Mary, a Maths Applied student, to construct a cardboard box for them with the following specifications:

The box must be of height 90 cm and the **sum** of the height, width (x) and length is to be 220 cm.



(a) Show that the volume of this box can be expressed as:

$$V = -90x^2 + 11700x$$

where x is the width of the box in cm.

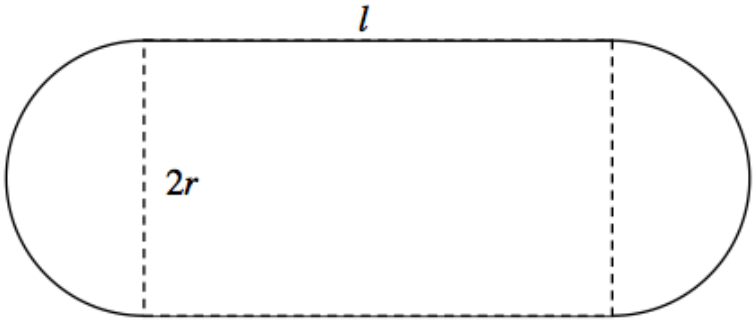
Question 6 (Approximately 11 minutes) 2009 Exam

For this question, you may need to use this information:

Circumference of a circle = $2\pi r$

Area of a circle = πr^2

A local council is constructing a new sports ground. The shape of the ground will be rectangular with semi-circular ends. The longer side of the rectangle is l metres long, and the shorter side is $2r$ metres long (and thus the semi-circles have radius r metres). The total length around the perimeter of the ground is 400 metres.



(b) Show that the area A of **the rectangular part only** is given by $A = 400r - 2\pi r^2$.

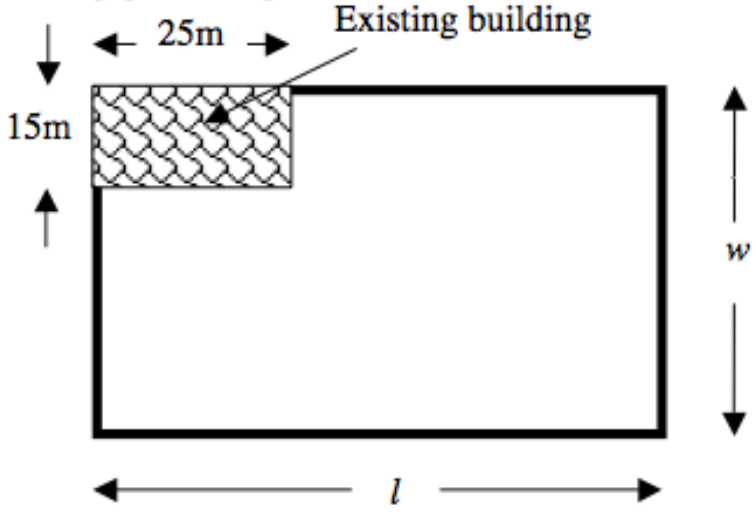
Question 5 (Approximately 15 minutes)

2007 Exam

A rectangular enclosure is to be built with length l and width w, and the enclosure is to join an existing building at two corners as shown in the diagram.

The existing building is 25 metres long and 15 metres wide.

A total of 240 metres of fencing material can be used to build the enclosure.



(a) Show that the area (A) of the enclosure (*not* including the existing building) is given by the equation $A = -l^2 + 140l - 375$.