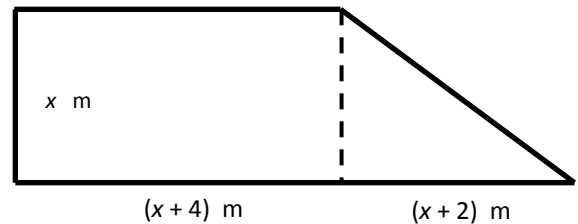## Section 1: Quadratic graphs and equations

Exercise level 3 (Extension)

1. The garden shown in the diagram is in the shape of a rectangle, with an attached triangular area. It is surrounded by a continuous fence, and the dimensions shown are measured in metres.

    x m

    $(x + 4)$ m $(x + 2)$ m

    (i)   Write down a formula for the area A m^2 of the garden.
    (ii) Find a second formula for the length P of the fence in metres, leaving a square root in your formula.
    (iii) The area of the garden is 200 m^2. Find the length of the fence, giving your answer to 3 significant figures.

2. In a cinema, there are n rows of seats set out in a rectangular block 300. After the cinema is enlarged, half as many rows plus two more are added, though with 5 fewer seats in each new row. This gives the cinema 120 extra seats. How many seats are in each of the old and new rows?

3. A rectangular enclosure is to be constructed against a long straight wall. The enclosure is to be built using 100 metres of fencing.
    (i)   Let the width of the enclosure be x metres. Draw a sketch, and write down a formula for the area of the enclosure.
    (ii) By completing the square, find the maximum possible area that can be enclosed, and find the dimensions of the enclosure to give that maximum area.
    (iii) Sketch the graph of your formula for the area. Interpret and explain the values of the intercepts of the graph with the x-axis in terms of the shape of the enclosure.