## Maximising Area When Perimeter Is Fixed

Question 1: The perimeter of a rectangular field is 200 m .
Find the maximum area of the field and the associated dimensions.
$x$


Question 2: A farmer has 200 m of fencing. He wishes to fence off a rectangular field against a wall to maximise the area of the field. Find the maximum area and the associated dimensions.


Question 3: A 400m perimeter running track is to have two semi-circles radius $r$ on the ends of a rectangle length $x$. Find $r$ and $\times$ if the area is to be maximised and calculate the maximum area in terms of pi.


Question 4: A conservatory is to be built against the side of a house. It has two straight edge walls and a semi-circular wall. To control costs the distance along the outside (ie 2 straight walls and a semi-circular wall is fixed at 14 m .

Each straight wall measures x m and the radius of the semi-circle is r m . Find $a$ and $r$ to 3 sig fig if the floor area is to be maximised.
Show you have found a maximum and calculate this area to 3 sig fig.


