

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



Question 2: A farmer has 200m 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 14m.

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.

