**Applied Differentiation Problems**

(a) A rectangle has a width cm and a length cm. Using calculus, find the maximum area of the rectangle.

(b) A car sales company sells cars per week. Its revenue per week is given by the equation . Using differentiation, find the number of cars which generates the maximum revenue, and the value of this revenue.

(a) The cost of a car journey when driving at a speed of x mph is given by . Using differentiation, find the value of that minimises the cost, and the minimum value of .

(b) The volume of a box is given by . Use calculus to find the maximum volume of the box, and the value of for which this occurs.

(a) A picture frame has a perimeter of 120 cm. If the width of the frame is cm, then show that the height of the frame is cm. Hence use calculus to find the value of that gives a maximum area for the frame. Calculate this maximum area.

(b) A farmer has enough stone for 80 m of dry stone walling. He wants to create a field with the largest area possible. Find the dimensions of the field that gives this maximum area.

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