**Applied Differentiation Problems**

(a) A rectangle has a width $x$ cm and a length $(30-2x) $cm. Using calculus, find the maximum area of the rectangle.

(b) A car sales company sells $x$ cars per week. Its revenue $R$ per week is given by the equation $R=0.2x^{2}-10x+1750$. Using differentiation, find the number of cars which generates the maximum revenue, and the value of this revenue.

(a) The cost $C$ of a car journey when driving at a speed of x mph is given by $C=\frac{720}{x}+0.2x+6$ . Using differentiation, find the value of $x$ that minimises the cost, and the minimum value of $C$.

(b) The volume of a box is given by $V=x(5-x)^{2}$. Use calculus to find the maximum volume of the box, and the value of $x$ for which this occurs.

(a) A picture frame has a perimeter of 120 cm. If the width of the frame is $x$ cm, then show that the height of the frame is $(60-x)$ cm. Hence use calculus to find the value of $x $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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