2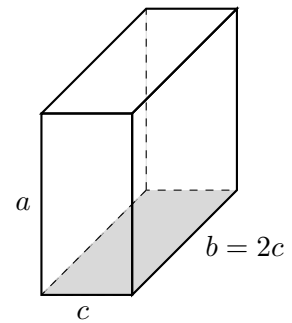. [9 points] A company is designing a new line of suitcases with height a, length b, and width c, all in inches. The dimensions of the new suitcases need to satisfy the constraints

$$b = 2c \qquad \text{and} \qquad a + b + c = 45.$$

What are the dimensions of such a suitcase with the largest possible volume, and what is this maximum volume?

Use calculus to find and justify your answer, and be sure to show enough evidence that the values you find do in fact maximize the volume of the suitcase.

Answer: The volume is maximized when $a =$ _____ in., $b =$ _____ in.,   and $c =$ _____ in.,

and the maximum volume is _____ cubic inches.