Show all work, including mental steps, in a clearly organized way that speaks for itself. Use proper mathematical notation, identifying expressions by their proper symbols (introducing them if necessary), and use EQUAL SIGNS and arrows when appropriate. Always SIMPLIFY expressions. BOX final short answers. LABEL parts of problem. Keep answers EXACT (but give decimal approximations for interpretation when appropriate). Indicate where technology is used and what type (Maple, GC).

A package in the shape of a rectangular box can be mailed through the US Postal Service if the sum of its length and girth (girth equals the perimeter of the rectangular cross-section perpendicular to the longest dimension "length") is at most 108 in. Find the dimensions and volume (in cubic ft) of the package with the largest volume that can be mailed. Verify the local max with the second derivative test, clearly explained. Be sure to indicate what your variable names stand for and make a diagram of the region of the plane where you consider this 2d max/min problem, indicating the conditions which lead to its boundaries.

▶ **solution**