Math215

Homework 6, Problem 2

November 24, 2021

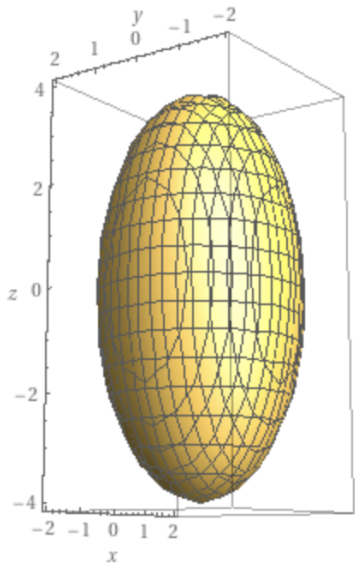
11.1 Problem 12

Find and sketch the domain of the function: $f(x, y, z) = ln(16 - 4x^2 - 4y^2 - z^2)$

Solution:

$$16 - 4x^2 - 4y^2 - z^2 > 0$$
$$4x^2 + 4y^2 + z^2 < 16$$
$$\frac{x^2}{4} + \frac{y^2}{4} + \frac{z^2}{16} < 1$$
$$\frac{x^2}{2^2} + \frac{y^2}{2^2} + \frac{z^2}{4^2} < 1$$

The domain is an ellipsoid bounded by $\frac{x^2}{2^2} + \frac{y^2}{2^2} + \frac{z^2}{4^2} < 1$



1 Math 215 Homework 6, Question 6

The contour Map on the left is f whose graph is a cone. This is because the spacing between the contours are all uniformly spaced. The left hand side the contours get closer together as the distance from the origin increases hence, that is the contour map of a paraboloid, and thus it is the contour graph of function g