

Math 126 Homework 8 Hints

Problems 14.7/40,43: The algebra in these two problems can get a little messy if you aren't careful.

In 40, you should be maximizing $\sqrt{x^2 + y^2 + z^2}$ under the condition that $x^2y^2z = 1$. So you need to find the absolute minimum of the function $f(x, y) = \sqrt{x^2 + y^2 + \left(\frac{1}{x^2y^2}\right)^2}$ and the points where it occurs. Here I will give you the hint that the absolute minimum occurs at all the critical points. So you only need to find the critical points. The algebra can be long, but if you're organized and careful it's very doable.

In 43, you should be maximizing $(2x)(2y)(2z)$ under the condition that $9x^2 + 36y^2 + 4z^2 = 36$. So you need to find the absolute maximum of the function $f(x, y) = 8xy\sqrt{\frac{36-9x^2-36y^2}{4}}$. On the critical point with x , y , and z positive makes sense. You need to find it.

Problems 15.1/12,13: Both of these ask you to evaluate a double integral by recognizing the volume of the solid in 3D. Note that $z = 5 - x$ is a plane in 3D, and $z = 4 - 2y$ is also a plane in 3D. So both solids are volumes under a plane and above a rectangle.

Label the points on the graph of the function at the four corners of each rectangle and try to draw the shape for each problem.

One of the shapes is a 'wedge' and the other is a 'wedge on top of a rectangular box'.

The volume of a wedge is the area of the triangular side times the width. The answers are 37.5 and 3, now see if you can show the work to get them.