

Math 324 Quiz 1

January 24, 2017

Make sure to **show your work!** If you need additional space, please write on the back. Don't forget to **have fun!**

Problem 1. Find the volume of the tetrahedron enclosed by the coordinate planes and the tetrahedron $2x + 3y + 4z = 5$. You **must** use integrals, just quoting a general formula is worth nothing. [*Bonus: instead work out the general case, when the plane is $ax + by + cz = d$ with a, b, c, d non-negative constants and with $d > 0$].*

Problem 2. Use cylindrical coordinates to evaluate the integral

$$\int \int \int_R e^{2z} dV$$

where R is the region enclosed by the paraboloid $z = 12 + x^2 + y^2$, the cylinder $x^2 + y^2 = 4$, and the xy -plane.