Math 53 (Multivariable Calculus), Section 102 & 108
Week 10, Friday
Oct 28, 2022
For the other materials: seewoo5.github.io/teaching/2022Fall

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1. Let $0 \leq a < b \leq 1$. Find the area of the part of the unit sphere $x^2 + y^2 + z^2 = 1$ that lies above the plane $z = a$ and below the plane $z = b$. Check that the result only depends on the value $(b - a)$.

2. Evaluate
$$\int_{-1}^{1} \int_{-\sqrt{1-x^2}}^{\sqrt{1-x^2}} \int_{1-\sqrt{1-x^2-y^2}}^{1+\sqrt{1-x^2-y^2}} (x^2 + y^2 + z^2)^{1/2} dz dy dx.$$
(Hint: Change to the spherical coordinate.)