

Math 13: Written Homework # 7
Due May 14 at 5pm

Please make sure your homework is stapled, if necessary before handing it in. Do not use paper clips or any variation of folding techniques to connect papers.

Solutions should be justified in a rigorous way. If you are unsure how much work to show, you can ask me prior to turning in your assignment. The problems are taken from the 7th edition of Stewart's *Calculus*, although occasionally a problem will be modified to be slightly different from its textbook counterpart.

- (1) (Problem # 24, Chapter 16.6) Find a parametric representation for the surface which is the part of the sphere $x^2 + y^2 + z^2 = 16$ which lies between the planes $z = -2$ and $z = 2$.
- (2) (Problem # 36, Chapter 16.6) Let $\mathbf{r}(u, v) = \langle \sin u, \cos u \sin v, \sin v \rangle$. Find an equation for the tangent plane to this surface at $u = \frac{\pi}{6}$ and $v = \frac{\pi}{6}$. (For fun, you might want to try to sketch this surface by hand, or at least look at a picture of it on a computer. You do not have to hand in the sketch.)
- (3) (Problem #64a, Chapter 16.6) Find a parametric representation for the torus obtained by rotating about the z -axis the circle in the xz -plane with center at $(b, 0, 0)$ and radius $a < b$. (See the textbook for a picture and relevant hint.)
- (4) (Problem # 64c, Chapter 16.6) Find the surface area of a torus obtained by rotating a circle of radius a in the xz -plane about the z -axis.
- (5) (Problem #42, Chapter 16.6) Find the surface area of the part of the cone $z = \sqrt{x^2 + y^2}$ that lies between the plane $y = x$ and the parabolic cylinder $y = x^2$.