

Homework 3, due Friday 2/3

1. Sketch all points in \mathbb{R}^3 with cylindrical coordinates (r, θ, z) such that
 - (a) $r = 1, \theta \in [0, \frac{\pi}{2}], z \geq 0$.
 - (b) $r \in [0, 1], \theta = \pi, z \in [-1, 1]$.
2. Sketch all points in \mathbb{R}^3 with spherical coordinates (ρ, θ, ϕ) such that
 - (a) $\rho \in [0, 1], \theta \in [0, 2\pi), \phi = \frac{\pi}{4}$.
 - (b) $\rho = 1, \theta = 0, \phi \in [0, \pi]$.
3. p. 105, problem 1 (a), (c) (pick at least 4 values for c in each case)
4. p. 106, problems 6, 17, 2
5. What's the shape of the set of all points such that $\rho = 2$?
6. p. 139, problems 1 (a), (c), 2 (a)
7. p. 139, problems 3 (a), (d)
8. First do p. 140, problem (5). Now compute the value of $f(x, y) = x^2 + y^3$ at $(3.1, 0.9)$ and compare with the z -coordinate of the tangent plane you just computed at $(3.1, 0.9)$.
9. p. 140, problems, 6 (a), (c)
10. p. 140, problem 10
11. Consider $f(x, y) = (xe^y)^8$. Find the equation of the tangent plane at $(1, 0)$. Now do problem 12 (a) on p. 140.