Spring, 2015 | **MATH 4250/6250** | T. Shifrin

PROBLEM SET #1

DUE January 15, 2015.

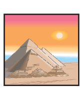
Instructions: Turn in (at least) five problems of your choice, but **including any underlined problem(s)**. Graduate students should include at least one "pyramid" problem.

Problems to work but not hand in: #A.1.1, A.1.4, A.2.1, 1.1.1, 1.1.4, 1.1.6, 1.1.8, 1.2.1c.

 #A.2.2, A.2.3, 1.1.5, 1.1.7, 1.2.1ab[*].

A. Show that every circle in $\mathbb{R}^3$ (or in $\mathbb{R}^n$ for $n > 3$) can be parametrized by a function of the form $\boldsymbol{\beta}(t) = P_0 + (\cos t)\mathbf{v}_1 + (\sin t)\mathbf{v}_2$ for some pair $\mathbf{v}_1, \mathbf{v}_2$ of vectors satisfying $\mathbf{v}_1 \cdot \mathbf{v}_2 = 0$ and $\|\mathbf{v}_1\| = \|\mathbf{v}_2\|$. Explicitly so parametrize the intersection of the sphere of radius 5 centered at the origin with the plane $x + 2y + 2z = 9$.

 #1.1.9, 1.1.10, **<u>1.2.7</u>**.

 #1.1.13, 3.4.8 **and** 3.4.10[†].

[*]Note that these count as a single problem.
[†]Especially for students interested in physics. This combination will count as 1.5 problems.