Math 2415

Problem Section #6

Exam One Review

To allow you maximum flexibility we will not assess your active participation in the Problem Section this week. Students in the Monday Problem Sections may attend a Friday Section if they wish (look for email instructions from your TA). There will be no problem sessions on Monday.

Do whatever past exam problems your group wants to. Here are some suggestions to get started:

1. (From Fall 2010, Exam 1) Find the traces (i.e., slices) of the surface

$$x^2 = 1 + \frac{y^2}{4} + \frac{z^2}{9}$$

   in the planes $y = 0$, $z = 0$, and $x = k$, for $k = 0, \pm 1, \pm 2, \pm 3$. Then sketch the surface and name it.

2. (From Fall 2009, Exam 1)

   (a) Find a vector parametric equation for the line through the point $(1, 2, -1)$ that is normal to the plane $2x - y + 3z = 12$.

   (b) Find a parametrization of the plane containing the point $(1, -2, 1)$, $(2, -1, 0)$ and $(3, -2, 2)$.

3. (From Fall 2006 Exam 1) Suppose that

$$\mathbf{r}(s, t) = (1 + 2s - 3t, 5 + s, -3 + 4s - t)$$

   is a parametrization of a plane. Find a level set equation for this plane, *i.e.*, an equation of the form $ax + by + cz = d$.

4. (From Fall 2006 Exam 1) Show that the parametrized curve $\mathbf{r}(t) = (\cos t, \sin t, 1)$ lies on the following two surfaces:

   (a) $\rho = \sqrt{2}$ (in spherical coordinates)

   (b) $z = r$ (in cylindrical coordinates).

   Also sketch both surfaces and the curve in the same figure.

5. Spring 2019, Exam 1

6. Fall 2016, Exam 1, problems 1,2,3,5,6,7

7. Spring 2016, Exam 1

8. Fall 2015 Exam 1, problems 1,2,3,5,7