Math 263 Assignment 2
Due September 19

■ **Problems from the text (do NOT turn in these problems):**

- Section 14.1: 1–6, 8–10, 14, 17, 27, 28, 36–38, 41, 42.
- Section 14.2: 4–8, 12–17, 21–26, 30, 35–38, 49, 51.
- Section 14.3: 3–6, 11, 15, 18, 22, 23, 32, 43, 45, 46, 53, 56, 57.
- Section 14.4: 12–16, 19, 25, 27, 28, 30.

■ **Problems to turn in:**

1) Find the angle at which the following curves intersect:

$$\mathbf{r}_1(t) = \cos t\,\mathbf{i} + \sin t\,\mathbf{j} + t\,\mathbf{k}, \quad \mathbf{r}_2(t) = (1+t)\mathbf{i} + t^2\mathbf{j} + t^3\mathbf{k}.$$

2) Evaluate :

$$\int_0^1 \left[\frac{t^2}{1+t^2}\mathbf{i} + t\sin(\pi t)\mathbf{j}\right] dt.$$

3) Find the tangential and normal components of the acceleration vector of the particle whose position function is given by

$$t\mathbf{i} + t^2\mathbf{j} + 3t\mathbf{k}.$$

4) A gun is fired with angle of elevation 30°. What is the muzzle speed if the maximum height of the shell is 500 m?

The next two questions are on material from the text, pages 870-871.

5) Find an equation of the osculating plane of the curve

$$x = \cos 2t, \quad y = t, \quad z = \sin 3t$$

at the point $(1, \pi, 0)$.

6) At what point on the curve $x = t^3, y = 3t, z = t^4$ is the normal plane parallel to $z = \frac{3}{4}(x+y) - 2$?