Worksheet #26; date: 04/24/2018
MATH 53 Multivariable Calculus

1. *(Stewart 16.6.3)* Identify the surface with the given vector equation:

$$\mathbf{r}(u, v) = (u + v)\mathbf{i} + (3 - v)\mathbf{j} + (1 + 4u + 5v)\mathbf{k}$$

2. *(Stewart 16.6.5)* Identify the surface with the given vector equation:

$$\mathbf{r}(u, v) = \langle s \cos t, s \sin t, s \rangle$$

3. *(Stewart 16.6.21)* Find a parametric representation for the surface: The part of the hyperboloid $4x^2 - 4y^2 - z^2 = 4$ that lies in front of the yz-plane.

4. *(Stewart 16.6.23)* Find a parametric representation for the surface: The part of the sphere $x^2 + y^2 + z^2 = 4$ that lies above the cone $z = \sqrt{x^2 + y^2}$.

5. *(Stewart 16.6.33)* Find an equation of the tangent plane to the given metric surface at the specified point.

$$x = u + v, \quad y = 3u^2, \quad z = u - v; \quad (2, 3, 0)$$

6. *(Stewart 16.6.49)* Find the area of the surface with parametric equations $x = u^2$, $y = uv$, $z = \frac{1}{2}v^2$, $0 \le u \le 1$, $0 \le v \le 2$.

7. *(Challenging; Stewart 16.6.62)* A surface is created when the cylinder $y^2 + z^2 = 1$ intersects the cylinder $x^2 + z^2 = 1$. Find the area of this surface.

8. Turn in your homework, it's quiz time!

9. *(Stewart 16.7.9)* Evaluate the surface integral

$$\iint_S x^2 yz \, dS,$$

where S is the part of the plane $2x + 2y + z = 4$ that lies above the rectangle $[0, 3] \times [0, 2]$.

10. *(Stewart 16.7.17)* Evaluate the surface integral

$$\iint_S (x^2 z + y^2 z) \, dS,$$

where S is the hemisphere $x^2 + y^2 + z^2 = 4$, $z \ge 0$.