MA 213 Worksheet #23

Section 16.6

1 *16.6.5* Identify the surface with the vector equation:

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

2 *16.6.21* Find a parametric representation for the part of the hyperboloid $4x^2 - 4y^2 - z^2 = 4$ that lies in front of the yz-plane.

3 *16.6.37* Find an equation of the tangent plane to the parametric surface

$$\mathbf{r}(u,v) = \langle u^2, 2u\sin v, u\cos v\rangle,$$

at the point $u = 1, v = 0$.

4 Find the surface area.

16.6.47 The part of the paraboloid $y = x^2 + z^2$ that lies within the cylinder $x^2 + z^2 = 16$.

16.6.49 The surface with parametric equations $x = u^2,\ \ y = uv,\ \ z = \frac{1}{2}v^2;\ \ 0 \le u \le 1,\ \ 0 \le v \le 2$.

Additional Recommended Problems

5 *16.6.3* Identify the surface with the given vector equation:

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

6 *16.6.23* Find a parametric representation for the part of the sphere $x^2 + y^2 + z^2 = 4$ that lies above the cone $z = \sqrt{x^2+y^2}$.

7 *16.6.33* Find an equation of the tangent plane to the given parametric surface at the specified point.

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

8 *16.6.59*

(a) Show that the parametric equations $x = a\sin u\cos v$, $y = b\sin u\sin v$, $z = c\cos u$ for $0 \le u \le \pi$ and $0 \le v \le 2\pi$, represent a ellipsoid.

(b) Set up, but do not evaluate, a double integral for the surface area of the ellipsoid in part (a).