

Worksheet Feb. 21

1. Parametrize the following surfaces:

(a) The part of the paraboloid $x^2 - y + z^2 = 5$ lying inside the cylinder $x^2 + z^2 = 4$.

(b) The ellipsoid

$$\frac{x^2}{4} + \frac{y^2}{9} + \frac{z^2}{16} = 1.$$

(Hint: Think about how you adjusted the parametrization of a circle $x = \cos(t)$, $y = \sin(t)$ to get a parametrization of an ellipse such as $\frac{x^2}{4} + \frac{y^2}{9} = 1$. Then do a similar trick beginning with a parametrization of the sphere.)

2. Find the tangent plane to the surface $\mathbf{r}(u, v) = \langle u + v, u^2v, u - v \rangle$ at the point $\mathbf{r}(1, 0)$.