

Homework 6

Due date: May 18, 2017

Problem 1: Find an equation of the tangent plane to the surface parametrized by

$$\mathbf{S}(u, v) = (u + v)\mathbf{i} + 3u^2\mathbf{j} + (u - v)\mathbf{k}$$

at the point $(2, 3, 0)$.

Problem 2: Evaluate the area of:

- (a) the part of the plane $3x + 2y + z = 6$ that lies in the first octant;
- (b) the part of the cone $x^2 + y^2 = z^2$ that lies in the half-space $x < 0$ between heights $z = 1$ and $z = 2$.

Hint: for (b), it might be helpful to look at Example 7 in Section 16.4 of the text.

Problem 3: Calculate the integral

$$\iint_{\Sigma} y^2 dS$$

where Σ is the part of the sphere $x^2 + y^2 + z^2 = 4$ that lies inside the cylinder $x^2 + y^2 = 1$ and above the xy -plane in the $y < 0$ region.