Math 2210 - Assignment 10

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Sections 13.6 through 13.7

1 Section 13.6

13.6.1 Find the surface area of the part of the plane $3x + 4y + 6z = 12$ that is above the rectangle in the xy-plane with vertices $(0, 0), (2, 0), (2, 1)$, and $(0, 1)$. Make a sketch of the surface.

13.6.5 Find the surface area of the part of the cylinder $x^2 + z^2 = 9$ that is directly over the rectangle in the xy-plane with vertices $(0, 0)$, $(2, 0)$, $(2, 3)$, and $(0, 3)$. Make a sketch of the surface.

13.6.12 Find the surface area of the part of the cylinder $x^2 + y^2 = ay$ inside the sphere $x^2 + y^2 + z^2 = a^2$, $a > 0$. *Hint*: Project to the yz-plane to get the region of integration. Make a sketch of the surface.

13.6.13 Find the surface area of the part of the saddle $az = x^2 - y^2$ inside the cylinder $x^2 + y^2 = a^2$, $a > 0$. Make a sketch of the surface.

13.6.21 Four goats have grazing areas A, B, C and D, respectively. The first three goats are each tethered by ropes of length b, the first on a flat plane, the second on the outside of a sphere of radius a, and the third on the inside of a sphere of radius a. The fourth goat must stay inside a ring of radius b that has been dropped over a sphere of radius a. Determine formulas for A, B, C and D and arrange them in order of size. Assume that $b < a$.

2 Section 13.7

13.7.1 Evaluate the iterated integral:

$$\int_{-3}^{7}\int_{0}^{2x}\int_{y}^{x-1} dzdydx$$

13.7.5 Evaluate the iterated integral:

$$\int_4^{24} \int_0^{24-x} \int_0^{24-x-y} \frac{y+z}{x} dz dy dx$$

13.7.10 Evaluate the iterated integral:

$$\int_0^{\frac{\pi}{2}} \int_{\sin 2z}^{0} \int_0^{2yz} \sin\left(\frac{x}{y}\right) dxdydz$$

13.7.16 Sketch the solid:

$$S = \{(x, y, z) : 0 \leq x \leq y^2, 0 \leq y \leq \sqrt{z}, 0 \leq z \leq 1\}$$

and then write an iterated integral for:

$$\int \int \int_S f(x, y, z) dV$$

13.7.22 Calculate the volume of the solid in the first octant bounded by the elliptic cylinder $y^2 + 64z^2 = 4$ and the plane $y = x$.