

Math 2415

Homework on 15.3

1. Evaluate $\iint_D \sin(x^2 + y^2) dA$ where D is the domain $1 \leq x^2 + y^2 \leq 4$.
2. Calculate $\iint_D (3x + 2y) dA$ where D is the region in the first quadrant that is inside the circle $x^2 + y^2 = 4$, above the x axis and below the line $y = \sqrt{3}x$.
3. Convert the following iterated integrals from rectangular to polar coordinates and then evaluate.
 - (a) $\int_{-1}^1 \int_0^{\sqrt{1-x^2}} dy dx$
 - (b) $\int_{\sqrt{2}}^2 \int_{\sqrt{4-y^2}}^y dx dy$
4. Sketch the solid that lies inside the cylinder $x^2 + y^2 = 1$, above the xy -plane, and below the plane $z = x + 1$. The cylinder and the slanted plane intersect in a curve. Be sure to include this curve in your sketch. Use a double integral to calculate the volume of this solid.
5. Find the volume of the solid bounded by the elliptic paraboloids $z = x^2 + 5y^2$ and $z = 24 - 5x^2 - y^2$.