
Math 2130 - Homework # 6

Triple Integrals

Part 1 - Volumes of solids

1. Find the volume of the region E that is bounded by the paraboloid $z = x^2 + y^2$ and the plane $z = 4$.
 2. Find the volume of the region E that is bounded by the cone $y = \sqrt{x^2 + z^2}$ and $y = 2$.
 3. Find the volume of the region E that is bounded by the paraboloid $z = 16 - x^2 + y^2$ and $z = 7$.
 4. Find the volume of the solid E that is inside the cylinder $x^2 + y^2 = 9$, above the paraboloid $z = 9 - x^2 - y^2$, and below the plane $z = 12$.
-

Part 2 - Densities of solids

5. Consider a solid box E that is bounded by the planes $x = 0$, $x = 3$, $y = 0$, $y = 2$, $z = 0$, and $z = 1$. Find the mass of the box E if the density at each point is given by $\rho(x, y, z) = 2 - z$.
 6. Consider the region E that is bounded by the paraboloid $y = x^2 + z^2$ and the plane $y = 4$. Find the mass of E if the density at each point is given by $f(x, y, z) = \sqrt{x^2 + z^2}$.
 7. Consider the tetrahedron E that is bounded by the planes $x = 0$, $y = 0$, $z = 0$, and $x + y + z = 1$. Find the mass of E if the density at each point is given by $\rho(x, y, z) = y$.
-