
Math 2130 - Homework # 7

Spherical Coordinates

Part 1 - Plotting and graphing

1. Plot the point P with spherical coordinates $(\rho, \varphi, \theta) = (1, \pi/2, \pi/2)$.
Also, give the cartesian (x, y, z) coordinates for P .
 2. Plot the point P with spherical coordinates $(\rho, \varphi, \theta) = (3, \pi, \pi/2)$.
Also, give the cartesian (x, y, z) coordinates for P .
 3. Plot the point P with spherical coordinates $(\rho, \varphi, \theta) = (4, \pi/3, 0)$.
Also, give the cartesian (x, y, z) coordinates for P .
 4. Graph the surface described by $\varphi = \pi/6$
 5. Graph the solid described by $\rho \leq 2$ and $0 \leq \varphi \leq \pi/2$
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Part 2 - Integrals

6. Find the volume of the solid E that lies inside the cone $\varphi = \pi/6$ and inside the sphere $\rho = 4$.
 7. Find the density of the unit ball E described by $x^2 + y^2 + z^2 \leq 1$ if the density function at each point is given by $f(x, y, z) = x^2 + y^2 + z^2$.
 8. Evaluate $\iiint_E \sqrt{x^2 + y^2 + z^2} \, dV$ where E is the hemispherical solid that lies above the xy -plane and below the sphere $x^2 + y^2 + z^2 = 1$.
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