Name: MATH 241 §004

Quiz 6: §15.5, 15.7

Complete the following problems to the best of your ability. **SHOW ALL OF YOUR WORK.** Unshown work will not be graded. You may not use a calculator.

1. Set up a triple integral using rectangular coordinates to find the volume of the solid bounded above by the paraboloid $z = 2 - x^2 - y^2$ and below by $z = 3x^2 + 3y^2$.

2. Rewrite this integral using cylindrical coordinates: $\displaystyle\int_0^2 \int_{-\sqrt{4-y^2}}^{\sqrt{4-y^2}} \int_0^{\sqrt{4-y^2-z^2}} (4 - x^2 - y^2)^2 \, dx \, dz \, dy$

3. Use spherical coordinates to set up a triple integral to find the volume of the part of the sphere $z = \sqrt{9 - x^2 - y^2}$ that lies in the first octant.