MATH S1202: Calculus IV
Quiz 2
May 31, 2018

1.

(a) Write the standard Cartesian coordinates (x, y, z) in terms of cylindrical coordinates (r, θ, z) about the z-axis.

(b) In terms of cylindrical coordinates (r, θ, z), give a description of the solid region E lying below the plane $z = 4$ and above the cone $z^2 = x^2 + y^2$.

(c) Let $f(x, y, z) = \sqrt{x^2 + y^2 + z^2}$. Write an expression for the triple integral $\iiint_E f(x, y, z)dV$ in terms of iterated integrals in cylindrical coordinates (r, θ, z). You only need to write an expression; you don't need to compute an exact value.

2.

(a) Write the standard Cartesian coordinates (x, y, z) in terms of spherical coordinates (ρ, θ, φ).

(b) In terms of spherical coordinates (ρ, θ, φ), give a description of the ball B of radius 1 centered about the origin.

(c) Compute the triple integral of $f(x, y, z) = \sqrt{x^2 + y^2 + z^2}$ over the ball B. This time I want you to compute.

3. Find the *surface area* of the part of the plane $4x + 2y + z = 8$ that lies in the first octant.