Last Name: _____

First Name: _____

Student ID: _____

Quiz 10

Question 1. *(5 marks)* Use polar coordinates to find the volume of the solid inside the sphere $x^2+y^2+z^2=16$ and outside the cylinder $x^2+y^2=4$.

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Question 2. *(5 marks)* Find the surface area of the part of the surface $z = 1 + 3x + 2y^2$ that lies above the triangle with verticies $(0,0)$, $(0,1)$ and $(2,1)$.

Question 3. *(10 marks)* Find

$$\iiint_E f(x,y,z)dV$$

where $f(x,y,z) = 1$ and E is the region enclosed by the cylinder $x^2 + z^2 = 4$ and the planes $y = -1$ and $y + z = 4$. Note that this integral gives you the volume of E.

(Hints: Sketch a graph of E. To see what the plane $y + z = 4$ looks like, look at the projection on the yz-plane ($x = 0$) and think of what the projestion would look like on any plane $x = a$. For this integral you will probably have to use the tigonometric substitution $x = 2\sin\theta$.)