Integration Practice (Math 201 - Fall 2010) T. Tlas

Question 1: Find the volume of the region in space bounded on the sides by $y = x^2$, below by the plane $z = 0$ and above by the plane $y + z = 1$. Do the integration in all 6 orders $dz\,dx\,dy$, $dx\,dy\,dz$, etc....

Question 2: Find the integral of the function

$$\frac{1}{\sqrt{(x^2+y^2)(x^2+y^2+z^2)}}\Big(\frac{\sqrt{x^2+y^2}}{\sqrt{x^2+y^2+z^2}}+\frac{z}{\sqrt{x^2+y^2+z^2}}\Big)$$

over the region in the first octant bounded below by the sphere $x^2 + y^2 + (z-1)^2 = 1$ and above by the cone $x^2 + y^2 = (z-2)^2$.

Question 3: You are given that $\int_1^2 f(\alpha)\,d\alpha = 3$. Find

$$\int_1^5\int_2^7\int_{\exp(x+z^2\exp(xz^2))+1}^{\exp(x+z^2\exp(xz^2))+2} f\left[y-\exp\left(x+z^2\exp\left(xz^2\right)\right)\right]dy\,dx\,dz$$