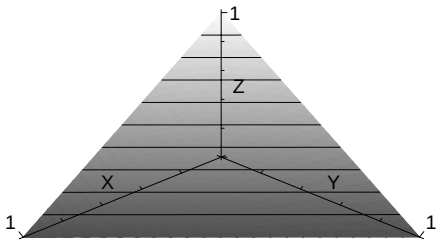
MAC 2313 Cal3 **Quiz 9** 1 Apr 2003 **Name:** _____

Show **ALL** work for credit; be neat. Calculators can be used for graphing and calculating only. Give exact answers when possible.

1. For the pyramid region W in the first octant below, a student has written the triple integrals for $\iiint_W f\ dV$ in (a) Cartesian (b) Cylindrical (c) Spherical coordinates as given below. Correct the student's answers.

$$(a)\ \int_0^{1-x-y}\int_0^{1-x}\int_0^{1} f(x,y,z) \qquad dz\ dx\ dy$$

$$(b)\ \int_0^{\pi/2}\int_0^{1}\int_0^{1-r\cos\theta-r\sin\theta} f(r,\theta,z) \qquad dz\ dr\ d\theta$$



$$(c)\ \int_0^{\pi/2}\int_{\pi/2}^{0}\int_0^{1/(\sin\phi\cos\theta+\sin\phi\sin\theta+\cos\phi)} f(\rho,\theta,z) \qquad \rho^2\sin\phi\ d\rho\ d\phi\ d\theta$$

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2. Compute $\int_C \mathbf{F}\cdot d\mathbf{r}$ twice, both directly and by using the Fundamental Theorem of Calculus for Line Integrals. Here $\mathbf{F} = \langle y, x, 6z^2\rangle$ and C is the helix $\mathbf{r}(t) = \langle \cos t, \sin t, t\rangle$ for $0 \le t \le 2\pi$.