

Name:

1. In terms of the spherical coordinates ρ, φ, θ , we have:

$$x =$$

$$y =$$

$$z =$$

2. Evaluate $\int_{-1}^1 \int_{-\sqrt{1-x^2}}^{\sqrt{1-x^2}} \sin(x^2 + y^2) dy dx$ by converting to polar coordinates.

Turn over for bouns fun.....

Try the following problems. Think about them yourself for a minute first, and then I'll give you a few minutes where teamwork is allowed.

3. Describe the surface given in spherical coordinates by $\varphi = \pi/4$.

4. Convert the following integral to polar coordinates:

$$\int_{1/\sqrt{2}}^1 \int_{\sqrt{1-x^2}}^x xy \, dy \, dx + \int_1^{\sqrt{2}} \int_0^x xy \, dy \, dx + \int_{\sqrt{2}}^2 \int_0^{\sqrt{4-x^2}} xy \, dy \, dx$$