Re: Volume of a section of a sphere

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- *From*: "Ioannis" <morpheus@xxxxxxxxxxxx>
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"Brian Blandford" <b.blandford@xxxxxxxxxxxxxxxxxxxxxx> wrote in message news:lH4Nf.70650$DM.31204@xxxxxxxxxxxxxxxxxxxxxxxxxxx

> A unit sphere is cut into 4 sections by two perpendicular planes at
> distances a, b from the centre. 0<a,b<1. What is the volume of the

smallest

> section?

Think of the problem in two dimensions and then generalize.

In two dimensions you are looking at the unit circle with two perpendicular lines cutting it at distances a and b.

Think of the intersection of the lines as your new origin. This amounts to displacing the circle so its center becomes (−a,−b). Then your circle's equation with respect to the new origin will be (x+a)^2+(y+b)^2=1.

You then want to find the area of the plane bounded by the translated circle and the positive x and y axes. The circle intersects the x−axis at the positive solution of (x+a)^2+b^2=1.

Call this solution x_0. Then your area will be:

Int_{0}^{x_0}(sqrt(1−(x+a)^2)−b)

Now generalize the above to three dimensions.

> Brian Blandford
> Anient and Modern Optics

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Ioannis −−− http://ioannis.virtualcomposer2000.com/

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