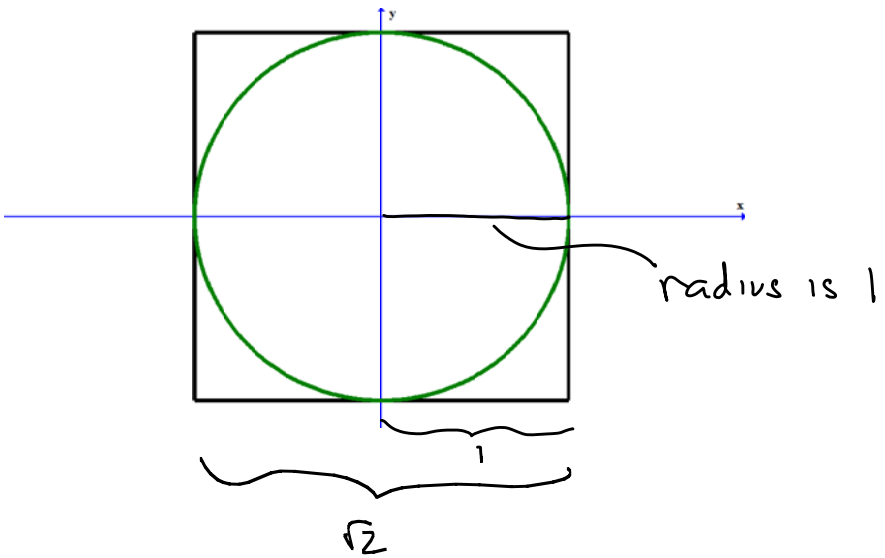
11.1 #9

To help visualize this problem, let's look at the 2D analogue using a square and circle.

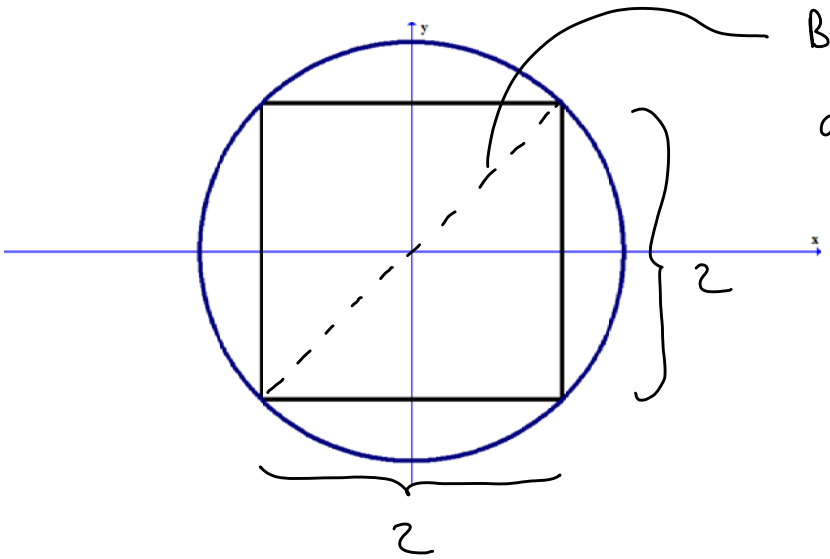
(a)




Circle: $x^2+y^2=1$

So sphere: $x^2+y^2+z^2=1$

(b) 2D motivation:

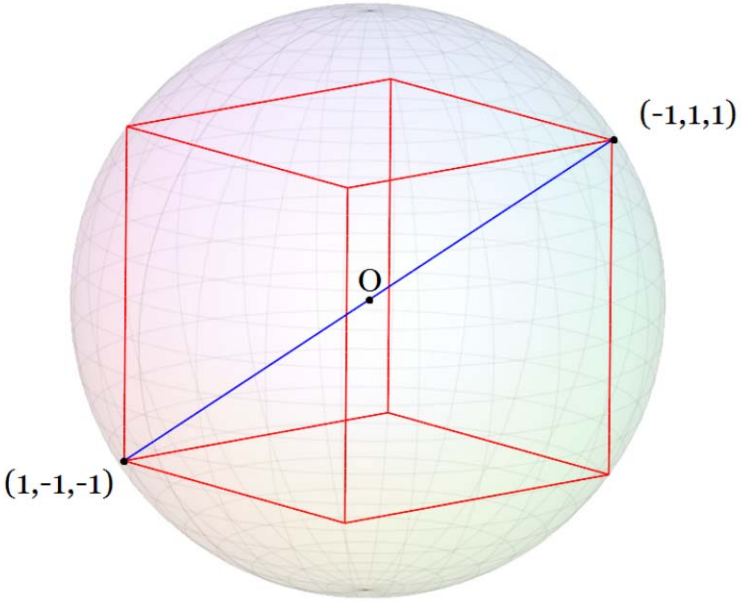



By Pythagorean Theorem diameter is $\sqrt{2^2+2^2} = 2\sqrt{2}$

So radius is $\sqrt{2}$.

Circle: $x^2+y^2=2$

# Solution for part (b):




⊛ The center is $(0,0,0)$.

⊛ The radius is the distance from the center to any corner of the box. Thus:

$$r = \sqrt{(-1-0)^2+(1-0)^2+(1-0)^2} = \sqrt{3}$$

⊛ The equation of the sphere is

$$\boxed{x^2+y^2+z^2=3}$$