

E1)

$$\text{goal: } r > \frac{\ell}{2}$$

distance origin  $\rightarrow$  vertex:

$$\sqrt{\sum_d \left(\frac{\ell}{2}\right)^2} = \sqrt{d} \frac{\ell}{2}$$

therefore:

$$2r + \frac{\ell}{2} = \sqrt{d} \frac{\ell}{2}$$

$$\Leftrightarrow 2r = \sqrt{d} \frac{\ell}{2} - \frac{\ell}{2}$$

$$\Leftrightarrow r = \frac{1}{2} \left( \sqrt{d} \frac{\ell}{2} - \frac{\ell}{2} \right) > \frac{\ell}{2} \Leftrightarrow d > 3^2 = 9$$

Since the radius of the inner ~~ball~~ hyperball ~~is~~ is at most the distance from the surface of an outer hyperball to its corresponding vertex.

$d=2$ :

