

HINT FOR 6.3 #8

Use cylindrical coordinates! Then $-2 \leq z \leq 2$ is the "easy" bound. If you look at a horizontal $z = \text{constant}$ slice, you see bounds for the others by looking at intersections of circles: $z \leq r \leq 2 \cos(\theta)$, $-\arccos(z/2) \leq \theta \leq \arccos(z/2)$.