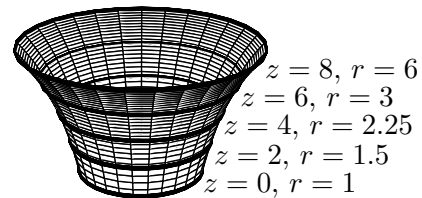


4. [16 points] An entrepreneurial University of Michigan Business Squirrel is marketing childrens' buckets with curved sides, as shown in the figure to the right, below. The figure gives the radius of the bucket, r , at different heights, z , from the bottom of the bucket. All lengths are given in inches. Suppose that a child fills one of these buckets with muddy water.

- a. [4 points] If the density of the water in the bucket is $\delta(z)$ oz/in³, write an integral that gives the mass of the water in the bucket.



- b. [4 points] If $\delta(z) = (24 - z)$ oz/in³, estimate the mass using your integral from (a).

- c. [8 points] Estimate the center of mass of the bucket.