11. [6 points] Jane is trying to make a spaceship in the shape of the region enclosed by the polar curve

\[ r = \frac{2 \cos(2\theta)}{\cos \theta} \]

where \( r \) is measured in meters and \( \theta \) is measured in radians. The region is graphed below.

a. [4 points] Find values of \( \theta \) that trace out the boundary of the region exactly once.

b. [2 points] Write an expression involving integrals that give the area of the region. Do not evaluate your integral.