1. [5pts] Find the length of the parametric curve \( x = e^t \cos t, y = e^t \sin t, \) \( 0 \leq t \leq \pi/2. \)

2. [5pts] Find the area of the surface generated by revolving the parametric curve \( x = \cos^2 t, y = \sin^2 t, \) \( 0 \leq t \leq \pi/2, \) about the \( y \)-axis.

3. [5pts] Find the area enclosed by the curve \( r = 2 \cos 5\theta. \)

4. [6pts] The limaçon \( r = 1 - 2 \sin \theta \) intersects the polar axis at two points \( A \) and \( B \) (apart from the pole).
   (a) Sketch the limaçon.
   (b) Find polar coordinates of \( A \) and \( B. \)
   (c) Find the slope of the tangent lines at \( A \) and at \( B. \)

5. [6pts] (a) Find all values of \( c \) such that the vector \( \vec{v} = (-4c, 3c, 1) \) and \( \vec{w} = (2, c, 4) \) are orthogonal.
   (b) Find two unit vectors \( \vec{a} \) and \( \vec{b} \) in 3-space with direction angles \( \alpha = \pi/3, \beta = \pi/4. \) What is the angle between \( \vec{a} \) and \( \vec{b} ? \)

6. [5pts] A parallelepiped has adjacent edges \( AB, AC, \) and \( AD \) where \( A(2, 1, -1), B(3, 0, 2), C(4, -2, 1), D(5, n, 0). \) If the volume of the parallelepiped is 4, then find the value of the real number \( n. \)