Name: Section: ID:

Q1. (a) Sketch the curve $C_1: r = 2\cos(2\theta)$ and $C_2: r = 1$ on the same axes

(b) Find the area inside the curve C_1 and outside the curve C_2 when $\theta \in [0, \frac{\pi}{4}]$.

Q2 (A)Let $\vec{a} = < 1,1,1 >$ and $\vec{b} = < 2,3,4 >$. Find $comp_{\vec{b}}\ \vec{a}$ and $proj_{\vec{b}}\ \vec{a}$

(B) Let $\vec{u} = < 1, -1,2 >$ and $\vec{b} = < 3, -2,0 >$. If $\vec{w} = proj_{\vec{v}}\ \vec{u}$ then find $(2\ \vec{u} - \vec{w}).\vec{v}$

Q3 (A) Find the area of the triangle whose vertices are $A = (1, -1,1), B = (0,1,1)$ and $C = (1,0, -1)$.

(B) Determine whether the points $A = (1,3,2),\ B = (3, -1,6), C = (5,2,0) and\ D = (3,6, -4)$ lie on the same plane.