

# Review for Midterm 2

## Second Midterm-2: April 3 Take home Exam.

### On Parametric Equations (Chapter 10).

Area and Length: Intersection point(s), Tangent line equation, Area and Length

**Exercise 1:** (a). Find ALL intersection points:  $r = 2$  and  $r = 2 \cos 2\theta$ .

(b) Find ALL tangent line equations at intersection points:  $r = 2 \sin \theta$  and  $r = \sin \theta + \cos \theta$ .

(c). Find the area of the region that lies inside both of the circles  $r = 2 \sin \theta$  and  $r = \sin \theta + \cos \theta$ .

**Exercise 2:** Change the standard equation for ellipse

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$$

into a parametric equation, then find the area of the region enclosed by the ellipse.

### On (Vectors and geometry of Spaces Chapter 12).

Vectors: Algebraic operation, vector products (Dot and cross, and scalar triple). Geometric meanings (addition, subtraction, dot product, cross product and mixed product).

**Exercise 3.** For what values of  $b$  is the vector  $(1, b, -2)$  perpendicular to vector  $(2, 5, -1)$ ?

**Exercise 4.** If the angle between vector  $\mathbf{U}$  and vector  $\mathbf{V}$  is  $\frac{\pi}{3}$ , and  $|\mathbf{U}| = 6$ ,  $|\mathbf{V}| = 10$ . Find  $|\mathbf{U} + \mathbf{V}|$ .

**WARNING: YOU ARE RESPONSIBLE FOR CHECKING OUT MY TYPOS!**

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