

## Review after Midterm 2

**Final exam May 9 (Thursday) 8:00–10:00pm at PHSC 1025.**

Power series: Radius of convergence, convergent interval; Taylor and Maclaurin series.

**Exercise 1.** Find the radius of convergence and the interval of convergence for

$$\sum_{n=0}^{\infty} \frac{(-1)^n x^n}{3^{2n} (2n)!}.$$

**Exercise 2.** Find the Taylor series for given functions at given point.

(a).

$$f(x) = x^2 + 4x + 5, \quad \text{at } x = -2.$$

(b).

$$f(x) = e^{x^2}, \quad \text{at } x = 0.$$

(c).

$$f(x) = \sin^2 x, \quad \text{at } x = 0.$$

**On Parametric Equations (Chapter 10).**

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

**Exercise 3:** (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 4:** 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, dot product). Geometric meanings (addition, subtraction, dot product).

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

**Exercise 6.** 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!**

Comments and question to: [mzhu@math.ou.edu](mailto:mzhu@math.ou.edu)

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