

## Review for Midterm 2

**Extra office hour: Friday 12:50-2:30pm**

Power series: Radius of convergence, convergent interval; Taylor and Maclaurin series; relation between a function and its Maclaurin series (control the remainder term); Binomial 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).

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

(c).

$$f(x) = (2 + x)^{-3}, \quad \text{at } x = 0.$$

**Exercise 3.** Try the following two questions:

(a). Find the value of

$$3 + \frac{9}{2!} + \frac{27}{3!} + \frac{81}{4!} + \cdots.$$

(b). Find the Maclaurin series for  $\sin x^2$  and  $\cos^2 x$ .

**On Parametric equations (Chapter 11).**

Area and Length: Intersection point(s), Area and Length

**Exercise 4:** (a). Find ALL intersection points:  $r = 2$  and  $r = 2 \cos 2\theta$ .

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

**Exercise 5:** 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.

**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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