Math 222 (Steven Sam), Fall 2016
Homework 10, due December 7

Note: This is not the final version of HW 10. This covers the material in Chapter 5 from 11/22 and 11/29. I will add a few more exercises for the material in Chapter 6 that will be covered in 11/29 and 12/1 after I get a better sense of how far we'll get by then.

Only the starred problems need to be submitted for grading.

Chapter 5

Chapter 5.6 (pages 107–108): 1, 2, 9*, 13, 14*, 17
Chapter 5.8 (page 109): 1* ("error term" in (b) means "remainder")

(E1)* Determine all p such that $\displaystyle\sum_{k=1}^{\infty} \left(\frac{6k^3+9k^2+2}{2k^6+10k+9}\right)^p$ converges.

(E2)* For each of the following, determine for which values of x the series converges.

(a) $\displaystyle\sum_{k=0}^{\infty} \frac{k^3 x^{2k}}{3^k}$

(b) $\displaystyle\sum_{k=1}^{\infty} \frac{(-2x)^k}{k}$

(c) $\displaystyle\sum_{k=0}^{\infty} \frac{x^k}{(2k+1)^4}$

(E3) Determine for which x we have $T_\infty \dfrac{1}{(1-3x)^2} = \dfrac{1}{(1-3x)^2}$.

(E4) Let $f(x) = \sin(x^5)$. Show that $T_\infty f(x) = f(x)$ for all x.

(E5) Which of the following series converge? Why?

(a) $\displaystyle\sum_{k=1}^{\infty} \frac{\arctan(k)}{k^2+1}$

(b) $\displaystyle\sum_{k=1}^{\infty} \frac{2k^2+3k+5}{\sqrt{k^5+k+7}}$

(c) $\displaystyle\sum_{k=1}^{\infty} \frac{3+2\cos(k)}{3^k}$