MATH 445 ASSIGNMENT 11
Fall 2009
Prof. Alexander
Due Monday November 23.

Kreyszig:
5.4 p. 187 #3, 6, 9, 10, 11
13.1 p. 606 #2, 9, 10, 12, 14, 17
13.2 p. 611 #2, 5, 7, 13, 14, 21, 23, 24, 30

SOME EVEN-NUMBERED SOLUTIONS:

5.4 (6) $y_1(x) = x^{1/2} \sum_{m=0}^{\infty} \frac{(-1)^m}{(2m+1)!} x^m, \quad y_2(x) = \sum_{m=0}^{\infty} \frac{(-1)^m}{(2m)!} x^m$
(10) $y_1(x) = x^2 \left(1 - \frac{1}{2}x^2 + \frac{9}{56}x^4 - \frac{13}{336}x^6 + ...\right), y_2(x) = x^{-1} \left(12 - 6x^2 + \frac{9}{2}x^4 - \frac{7}{4}x^6 + ...\right)$

13.1 (10) -9, 16 (12) $-\frac{7}{41} - \frac{22}{41}i$, both the same. (14) $-\frac{5}{13} - \frac{12}{13}i, -\frac{5}{13} + \frac{12}{13}i$

13.2 (2) $2(\cos\frac{\pi}{2} \pm i \sin\frac{\pi}{2})$
(14) π (24) For $\theta = \frac{1}{3}\arctan\frac{4}{3}$, the roots are

$$\sqrt[3]{5}(\cos\theta + i\sin\theta), \quad \sqrt[3]{5}(\cos(\theta + \frac{2}{3}\pi) + i\sin(\theta + \frac{2}{3}\pi)), \quad \sqrt[3]{5}(\cos(\theta + \frac{4}{3}\pi) + i\sin(\theta + \frac{4}{3}\pi)).$$

(30) Solutions $\pm(1 \pm i)\sqrt{2}$, factorization $(z^2 + 2\sqrt{2}z + 4)(z^2 - 2\sqrt{2}z + 4)$.