Remember to do the MatLab assignment as well, which is on the syllabus. Just click the link and follow the instructions.

Suggested problems: Sec. 3.2 # 2, 5, 6, 8, 12, 18, 22, 24, 25, 26 31; Sec. 3.3 # 2, 3, 5, 7, 11, 17, 21, 27; Sec. 3.4 # 1, 6, 9, 11, 14, 16, 26, 28, 30

Mandatory problems:

(1) **[8 pts]** Use Abel's theorem to find the Wronskian for the differential equation $ty'' + 2ty' + te^t y = 0$ for $t > 0$.

(2) Consider the IVP: $y'' + 2y' + 6y = 0$; $y(0) = 2$, $y'(0) = \alpha \geq 0$.
- (a) **[6 pts]** Solve the IVP.
- (b) **[4 pts]** Find α such that $y = 0$ when $t = 1$.
- (c) **[3 pts]** Solve for t as a function of α and y. Then determine the smallest t for which $y = 0$. [Will need to use wolfram alpha/mathematica]
- (d) **[2 pts]** Find $\lim_{\alpha\to\infty} t(\alpha, y = 0)$.

(3) Consider the IVP $9y'' + 12y' + 4y = 0$; $y(0) = a > 0$, $y'(0) = -1$.
- (a) **[5 pts]** Solve the IVP.
- (b) **[2 pts]** Find the critical value of a that separates solutions that become negative from those that are always positive.

Your homework raw score is: $\frac{n}{2m} \cdot M + \left(1 - \frac{n}{2m}\right) \cdot N = N + \frac{n}{2m}(M - N)$.