Math 2250−1
Week 12 concepts and homework, due November 18.

Recall that problems which are underlined are good for seeing if you can work with the underlying concepts; that the underlined problems are to be handed in; and that the Friday quiz will be drawn from all of these concepts and from these or related problems.

10.4: using convolution integrals to find inverse Laplace of F(s)G(s); using the differentiation theorem to find the Laplace transform of $t \cdot f(t)$; *using these (and other) techniques to solve linear differential equations.*
10.4: **2**, 3, 9, **10**, 15, **16**, 29, **30**, 37, **38**

10.5: using the unit step function to turn forcing on and off; Laplace transform of non−sinusoidal periodic functions
10.5: 3, 7, 11, 13, 25, 31, **26**, **34**

w12.1) Solve this initial value problem and then sketch the solution. Explain what happens. The forcing term is a sum of instananeous unit impulses, as discussed in EP7.6 and Monday's class notes.

$$x''(t) + 4x(t) = \delta(t-\pi) - \delta(t-3\pi).$$
$$x(0) = 0$$
$$x'(0) = 0$$

6.1: finding eigenvalues and eigenvectors (or a basis for the eigenspace if the eigenspace is more than one−dimensional).
6.1: 7, **8,** 17, **18**, **20**, **24**

6.2: diagonalizability: recognizing matrices for which there is an eigenbasis, and those for which there is not one. Writing the eigenbasis equation as $AP = PD$ *where P is the matrix of eigenvector columns, and D is the diagonal matrix of eigenvalues.*
6.2: **4**, **10**, **28** In 4, 10, 28, make sure to verify that $AP = PD$ in the cases that A is diagonalizable.

w12.2)
a) Using your work in 6.1.20, verify that $AP = PD$ for the matrix A in that problem.
b) Explain what happens if you re−order the eigenvector columns of P, and why.