

MA 401 Test 3 Review: 3.1, 3.2, 3.3, 4.1, 4.2

### **3.1 Fourier Method**

Apply the product-sum formulas to evaluate integrals

Ex. p. 130 #1a

### **3.2 Orthogonal Expansions**

Show that a set of functions is orthogonal using inner product

Ex. p. 143 #2ab

### **3.3 Classical Fourier Series**

Find the Fourier series, the Fourier cosine series, and the Fourier sine series

Find and graph an even or odd extension of a series

Determine the sum of a series at specified values of  $x$

See the [Fourier Series Worksheet](#) & the homework for more examples

Ex. p. 153 #3(not including the frequency spectrum),5

### **4.2 Sturm-Liouville Problems**

Determine all the eigenvalues and eigenfunctions of a SLP

Utilize hyperbolic trig functions when necessary

See the [Sturm-Liouville Worksheet](#) for more examples

Ex. p. 177-179 #2,3,6

### **4.1 Overview of Separation of Variables**

Use the in-class solution of the heat equation with  $u(0,t)=u(L,t)=0$ , find a specific  $u(x,t)$

Use the in-class solution of the wave equation with  $u(0,t)=u(L,t)=0$ , find a specific  $u(x,t)$

Apply the Method of Separation of Variables to solve PDEs with bounded spatial domains

Ex. p. 166 #1,2,3a & the homework