

You must attach this page to your homework set. You must print complete names clearly, and the person who wrote up the problems should sign as writer. Please put problems in order and staple in upper left-hand corner.

(Print names)

1. \_\_\_\_\_ 2. \_\_\_\_\_

3. \_\_\_\_\_

Writer: \_\_\_\_\_

Group Number \_\_\_\_\_

Consider

$$u_{tt} = 9u_{xx} \quad 0 \leq x \leq 4 \quad t > 0$$

$$u_x = \sin \frac{\pi x}{4} - \sin \pi x \quad 0 \leq x \leq 4$$

$$u_t(x, 0) = 2 \sin \frac{3\pi x}{4} \quad 0 \leq x \leq 4$$

$$u(0, t) = u(4, t) = 0 \quad t > 0$$

1. Find the solution using D'Alembert's formula.
2. Find the solution by the separation of variables formula.
3. Show these solutions are the same.
4. Find all eigenvalues and eigenvectors for
 
$$y'' + 2y' + \lambda y = 0$$

$$y(0) = 0$$

$$y'(1) = 0$$
5. Let  $f(x) = x(x - \ell)$   $0 \leq x \leq \ell$ . If  $f$  is extended as an odd periodic function, find its Fourier Series.
6. Page 108 #2