# PH570 Mathematical Physics

**Homework Assignments**

from *Mathematical Methods in the Physical Sciences (3rd edition)* by Mary Boas

Instructor: Dr. Tansil (Spring 2012)

<table>
<thead>
<tr>
<th>Week</th>
<th>Assign. #</th>
<th>ASSIGNMENT DUE (usually on Friday)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Chap. 3, sec. 4, prob. 14, 16, 23 (p. 105)</td>
</tr>
</tbody>
</table>
| 2    | 2         | Chap. 6, sec. 3, prob. 4, 6, 15, 16, 17 (p. 284-285)  
(for prob. 4&6, see instructions above prob. 2) |
| 3    | 3         | Chap. 6, sec. 4, prob. 4, 6, 8 (p. 289)  
Chap. 6, sec. 6, prob. 11, 17 (p. 294-295)  
(for prob. 11, see instructions above prob. 10)  
Chap. 6, sec. 7, prob. 7, 14 (p. 298-299) |
| 4    | 4         | Chap. 6, sec. 8, prob. 6, 11, 19, 20 (p. 307-308)  
Chap. 6, sec. 10, prob. 1, 7, 12 (p. 322-323)  
(for prob. 7, see instructions above prob. 3) |
| 5    | 5         | Chap. 6, sec. 11, prob. 7, 12, 15 (p. 334-335)  
(see instructions above prob. 3)  
**Test on Friday, Feb. 17, 2012** |
| 6    | 6         | Chap. 10, sec. 8, prob. 1, 3, 5 (p. 524) |
| 7    | 7         | Chap. 10, sec. 9, prob. 4, 5, 17, 18, 20 (p. 528) |
| 8    | 8         | **Bonus problem:** Find the acceleration components in parabolic coordinates using Lagrange equations.  
Chap. 7, sec. 5, prob. 7, 13 (p. 355)  
(for prob. 7, see instructions above prob. 1)  
Chap. 7, sec. 8, prob. 14(b), 16 (p. 363-364)  
(do only the sine-cosine series in prob. 14(b)) |
| 9    |           | **Spring Break, Mar. 10 – 18, 2012** |
# PH570 Mathematical Physics

## Homework Assignments

*from* Mathematical Methods in the Physical Sciences (3rd edition) by Mary Boas

**Instructor:** Dr. Tansil (Spring 2012)

<table>
<thead>
<tr>
<th>Week</th>
<th>Assign. #</th>
<th>ASSIGNMENT DUE (usually on Friday)</th>
</tr>
</thead>
</table>
| 10   | 9         | Chap. 7, sec. 9, prob. 15, 18 (p. 370-371)  
(for prob. 18, do the sketches and write simplified equations for the $a_n$, $b_n$ but do not evaluate the integrals).  
Chap. 7, sec. 10, prob. 3, 6 (p. 374) |
| 11   | 10        | Chap. 7, sec. 11, prob. 5, 7 (p. 377-378)  
Chap. 12, sec. 2, prob. 1, 3 (p. 567)  
Chap. 12, sec. 5, prob. 11, 12 (p. 574) |
| 12   | 11        | **Test on Monday, Apr. 2, 2012**  
Chap. 12, sec. 9, prob. 1, 2 (p. 581)  
*Bonus problem*: expand $\cos(\pi x)$ in Legendre series.  
Chap. 12, sec. 14, prob. 1, 2 (p. 592)  
**Easter Break, Apr. 6 – 8, 2012** |
| 13   | 12        | Chap. 13, sec. 2, prob. 1, 7, 10 (p. 626-627)  
**Special problem 1**: find $T(x,y)$ inside a rect. plate (width=a, height=b) with temps on the sides given to be: left/top=$0^\circ$, bottom=$T_1$, right=$T_2$  
**Special problem 2**: Use computer software and plot isotherms for the semi-infinite rectangular plate problem ($T = 5, 10, 20, 40, 60, 80, 90, 95$). |
| 14   | 13        | Chap. 13, sec. 3, prob. 2, 6, 10 (p. 632-633)  
(in prob. 6, the eq. (3.15) referred to should be eq. (3.18). Also, answers to prob. 2 & 6 can be verified by using the general equation derived in class.)  
Chap. 13, sec. 5, prob. 2(a), 3(a), 7 (p. 642-643) |
| 15   | 14        | Chap. 13, sec. 5, prob. 12, 13, 14 (p. 644)  
Chap. 13, sec. 5, prob. 4, 5, 8 (p. 643)  
Chap. 13, sec. 6, prob. 1, 2 (p. 646)  
(for prob. 1, the book does the diagrams for n=0,1; m=1,2 so you should do them for n=0,1; m=3 and for n=2; m=1,2,3) |
| 16   | 15        | Chap. 13, sec. 7, prob. 2, 5, 8, 11, 14 (p. 650-651)  
(for prob. 2, 5, and 8, see instructions above prob. 1) |
| 17   |           | **Test on Monday, May 7, 2012** |