Homework Assignments
788 MATH 384 - 01
Partial Differential Equations
Spring 2006
Dr. Goutziers

Text:	**Fourier Series and Boundary Value Problems**
Author:	**James Ward Brown, Ruel V. Churchill**
Edition:	**Sixth**
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Office Hours: **M 09:00 am** **W 11:00 am** **R 12:00 pm** **F 02:00 pm**

Assignment			**Date**
1)	Page 2	Derive the solution to Example 1.	Jan 20
	Page 3	Verify the solution to Example 2.	
2)	Page 8	2 … Derive the one dimensional equation $\sigma\delta u_t = (K u_x)_x$; 3; 4.	Jan 23
3)	Page 15	1.	Jan 25
4)	Page 15	3; 4; 7.	Jan 27
Announcement of Quiz 1			**Jan 30**
Date:		**Friday, February 3**	
Sections:		**1 - 7**	
5)	Page 20	1; 2; 5.	Jan 30
6)	Page 23	3; 4.	Feb 03
7)	Page 23	1; 6; 7.	Feb 06
8)	Page 29	1; 4.	Feb 10
9)	Page 30	6.	Feb 13
Announcement of Test 1			**Feb 14**
Date:		**Monday, February 20**	
Sections:		**1 - 10**	
10)	Page 39	1.	Feb 15
11)	Page 39	2; 3.	Feb 17
12)	Page 39	4; 5.	Feb 22
13)	Page 47	1.	Mar 08
14)	Solve the boundary value problem		Mar 10

$$u_t(x,t) = 5u_{xx}(x,t) \qquad (0 < x < 3, t > 0)$$
$$u_x(0,t) = 0, u_x(3,t) = 0 \qquad (t \geq 0)$$
$$u(x,0) = x(3-x) \qquad (0 \leq x \leq 3)$$

Clearly show

- The separation of variables process.
- The determination of the eigenvalues and the eigenfunctions.
- The computation of the Fourier coefficients.

15)	Page 47	2.	Mar 15

Continued on Page 2

Announcement of Quiz 2			**Mar 17**
Date:		**Friday, March 24**	
Sections:		**11 - 17**	
16)	Page 53	5; 6.	Mar 20
17)	Page 64	2; 3; 4; 6; 7; 8.	Mar 31
Announcement of Test 2			**Mar 31**
Date:		**Wednesday, April 5**	
Sections:		**11 - 22**	
18)	Page 72	2; 4; 5; 8.	Apr 03
19)	Page 82	3; 5; 8.	Apr 10
Announcement of Quiz 3			**Apr 19**
Date:		**Wednesday, April 26**	
Sections:		**23 - 30**	
20)	Page 97	10; 11.	Apr 19
21)	Page 97	14.	Apr 21
22)	Page 95	2.	Apr 28
	Page 128	5; 6.	
Announcement of Test 3			**May 01**
Date:		**Friday, May 5**	
Sections:		**23 - 32, 39**	
23)	Page 129	8.	May 01
24)	Use the result derived in class		May 03

$$\Phi(r) = c_1 - \frac{q_0}{6k} r^2$$

to complete the solution of problem 8 Page 129.
Here are the steps you should take.

- Determine c_1 such that $U(1,t) = 0$. (you should find $c_1 = \frac{q_0}{6k}$)
- Determine $U(r,0)$. (you should find $U(r,0) = -\frac{q_0}{6k}\left(1 - r^2\right)$)
- Use formulas (22) and (23) on page 127, together with the Fourier sine series for $x\left(1-x^2\right), 0 < x < 1$, provided on page 129, to find the functions $U(r,t)$, and $u(r,t) = U(r,t) + \Phi(r)$.