



Prince of Songkla University
Faculty of Engineering

Final Test
6 October 2010
215-613 Mathematical Methods in Engineering

Semester 1/2553
9:00-12:00
Room: S817

Name _____ ID _____

Direction:

1. Open book exam. Everything is allowed.
2. There are total of 5 problems.

Problem	Full score	Your score
1	10	
2	10	
3	10	
4	20	
5	20	
Total	70	

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Instructor

215-613
Mathematical Methods in Engineering

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Total 70 points

1. Plot the graphs and determine if the following functions are odd, even, or neither odd nor even? (10 points)

(a) $y = (x^2 - x + 22)^2$

(b) $x = y^2$

(c) $y = -e^{|2x|}$

(d) $y = -x$

(e) $y = (2x - 1)^9$

2. Find the Fourier series of (10 points)

$$f(x) = -x, \quad (-2\pi < x < 2\pi), \quad p = 2L = 4\pi$$

3. Find the Fourier transform of (10 points)

$$f(x) = |x|, \quad -1 < x < 1$$

4. The 1-D heat conduction in a 1-m long iron rod can be described by

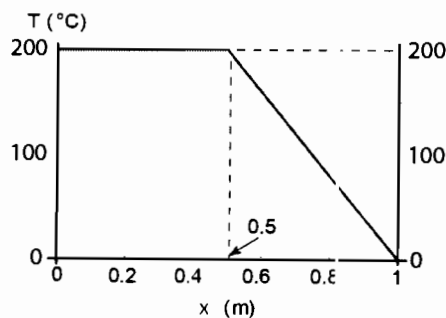
$$\frac{\partial T}{\partial t} = \frac{\partial^2 T}{\partial x^2}$$

The boundary and initial conditions are

$$\left. \frac{\partial T}{\partial x} \right|_{x=0} = 0$$

$$T(x=1, t) = 0 \text{ } ^\circ\text{C}$$

The initial temperature profile is shown in the following figure



Determine the temperature profile in the rod. (20 points)

5. If the iron rod is extended to be infinitely long, determine the temperature profile if the initial condition remains unchanged. (20 points)