## Physics 116C

Homework 2
due 10/11/07

Boas Chapter 13:
2.3, 2.5, 2.6, 2.7, 2.10, 2.11, 2.16,

In addition, in problem 2.10 find the exact value for $\mathrm{T}(5,5)$ using symmetry, and ideas from problems 2.11 and 2.16. Your answer should not be an infinite series.

## Additional problem:

1. Consider the equation for a damped string

$$
\frac{\partial^{2} y}{\partial x^{2}}=\frac{1}{V^{2}} \frac{\partial^{2} y}{\partial t^{2}}+\nu \frac{\partial y}{\partial t}
$$

The string is initially held at rest with the shape $y(x, t=0)=\sin \left(\frac{\pi x}{l}\right)+$ $\sin \left(\frac{100 \pi x}{l}\right)$. Also the ends of the string are fastened at $x=0$ and $x=l$, so that $y(x=0, t)=y(x=l, t)=0$. Calculate $y(x, t)$. Don't worry too much about expressing your final answer in terms of real functions, as this will vary over the values of parameters $V$ and $\nu$ chosen. But please comment on the analogy of this problem to overdamped and underdamped motion, and the regimes where each kind of motion will occur. Hint: Read Chapter 13 section 4

