

Chemistry 348
Problem Set III
Due: January 30, 2008

1. Use *Mathematica* to demonstrate that the wave function

$$\Psi(x,t) = A \sin(kx - \omega t)$$

is a traveling wave. (Hint: use a slide bar so that you can observe the wave while varying t).

2. Use *Mathematica* to demonstrate that the sum given below is the sum of two identical waves moving in opposite directions, and the result is a standing wave:

$$\Psi(x,t) = A \sin(kx - \omega t) + A \sin(kx + \omega t)$$

(Recommendation: Use the option `PlotRange -> {-low limit, high limit}` to set the limits for the y-axis in your plot so that as you change t the plot does not rescale.)

3. Problem 12.1

4. Problem 13.7 a. and b.

5. Problem 13.10

6. Problem 13.17

7. Problem 13.21

8. Problem 13.23

9. Problem 13.29