Preparing for Class 5

Reading: *H-H*, pp. 13-19

Problems: *H-H*, p.13: #21, 22, 23, 24

Also solve the following problem:

Suppose $f : [1, 7] \to \mathbf{R}$ is a *piecewise linear* function with a **continuous, unbroken graph**. You know the following information about f.

$f(1) = 6$.

The slope of its graph is $1/2$ on the interval $1 < t < 3$.

The slope of its graph is -3 on the interval $3 < t < 5$.

The slope of its graph is 1 on the interval $5 < t < 7$.

Find $f(3), f(5)$, and $f(7)$, then graph f. Show your work.

Homework Due: All problems assigned to prepare for Classes 3, 4 and 5 are due at the start of Class 5.

Exponents Review: Review the information sheet on exponents in preparation for the first Gateway test on these. This test will be given during Class 5.

Wednesday, September 6

Class 5:

Newton's Law of Cooling

The Calculus was developed to analyze models involving *rates of change*. Newton's Law of Cooling is an example of a model involving rates of change and proportionality. In class we will construct this model by doing a thought experiment. In lab this week you will learn how to analyze this model and you will also be able to check it against actual data from a cooling experiment.

Preparing for Class 6

Reading: *H-H* Finish Section 1.3

Problems: Section 1.3, # 1 - 13.

No Take-Home Quiz This Week.

Friday, September 8

Class 6:

Euler's Method

In lab this week you adapted the idea of "using slopes" to specify a piecewise-linear function to approximate the solution to Newton's Law of Cooling. The law is a model taking the form of a rate equation together with an initial value – i.e. an *initial value problem.*

Euler's Method is a method for obtaining a *piecwise linear approximation* to an unknown function solving an initial value problem. This is actually the method you used in lab this week. In this class we will look at the method more explicitly and see how it is based on the *point-slope* form of the rule for a linear function.