Expected Skills.
At the end of this section, students will be able to:

- list the pieces of information that define a function,
- determine when two functions are equal or not by comparing their algebraic definitions,
- draw the graph of important functions such as $\sin x, \cos x, \tan x$, quadratic functions (i.e. functions with x^2), absolute value of x,
- explain what the inverse function of a given function is,
- correctly use the conventions of dots and empty circles when drawing the graph of a function,
- shift and compress a function vertically or horizontally,
- compute the inverse function of "simple" polynomials.

Pre-Class Activity.
The goal of the pre-class activity is to have students begin to think about the concept of limits through the interpretation of a speedometer reading. Here are some aspects that can be mentioned and discussed in class:

1. How does the speedometer of a car work?
   Underline that the speedometer doesn't give the instantaneous velocity but must give the average velocity over short period of time. This leads naturally to the second and third questions.
   We don't expect students to be able to answer precisely these questions at that point. They will come up again in the course when talking about limits and derivatives.

- Warning: On the subpage entitled "If the speed were constant, we could just say distance = speed × time. Here's the new idea" of the Motivating Examples, the limiting process is not entirely rigorous, especially the explanation in the Solution part – indicate this in case a student ask a question about it.
- On the practical side, to make sure that students understand correctly what they have to read, it may be a good idea to show them the website in class and indicate what pages they have to read.

Worksheet.
This activity follows the following plan:

1. have the students come up and test conditions for two functions being equal,
2. graph and modify the absolute function,
3. investigate indeterminate expressions,
4. determine the inverse of exponential functions, and
5. investigate the distinction between the secant function and the inverse cosine function (Arccosine).

Supplemental Activity.
This activity has students investigate the relationship between three functions: the secant function, the cosine function, and the arccosine function through their graphs. The activity also introduces the principal branch

definition of the arccosine function and has the students investigate the importance of domain and range when working with compositions of functions and their inverses. The activity ends by having students consider reciprocal and inverse functions for other trigonometric functions.

It is suggested that instructors guide groups of students through this activity and frequently debrief the classroom as a whole after each group has completed each problem. Problem 5 of the activity can be adapted as a full class discussion to conclude the activity.

Active Review.
This Active Review is meant to be a session-long sequence of activities emphasizing the importance of mathematical communication in the context of a pre-calculus review. For more information, refer to the first page of the Active Review document.