Introductory Lesson 1 – What Is Calculus and Why Is It Useful?

Calculus is the study of two main types of change:

1. A **rate of change** measures how quickly one quantity is increasing or decreasing with respect to another.

Calculus can help answer the following questions about rates of change:

(a) Moving car

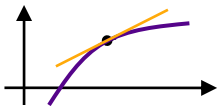
Given position at time *t*, what is the rate of change of position (velocity) at time *t*?

(b) Swim time of the 100-meter freestyle

Given the swim times of an average athlete at age *x* years, at what age is the swim time minimum?

(c) Geometry

How steep is a curve at a point?



2. **Accumulated change** is the net or total accumulation of all intermediate changes in a quantity.

Calculus can help answer the following questions about accumulated change:

(a) Moving car

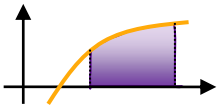
Given an initial position and the velocity over a time interval, what is the final position and/or the total distance traveled?

(b) Swim time of the 100-meter freestyle

Given the rate at which swim time is decreasing between the ages of 25 and 30, how many seconds in swim time are added during these years?

(c) Geometry

What is the area of a plane region bounded by a curve?



For next class:

1. Attempt to log on to WeBWorK using the web address, username, and password provided by your instructor.
2. Purchase the required calculator.