## ASSIGNMENT 1·4 (Section 002) Due: Friday, September 27

---

*There are two parts to this assignment. The first part is on WeBWorK — the link is available on the course webpage. The second part consists of the questions on this page. You are expected to provide full solutions (in full sentences) with complete arguments and justifications in a linear, coherent manner. You will be graded on the correctness, clarity and elegance of your solutions. Your answers must be typed or very neatly written. Your work must be your own and must be self-contained. Assignments must be stapled, with your name and student number at the top of each page. The assignment is due at the beginning of class on the due date.*

1. Imagine you drop a stone from the top of the Ladner Clock Tower. Sketch the position, velocity and acceleration graphs of the stone. Make sure to label your axes and state your assumptions. You do not have to come up with algebraic expressions for your functions, but you should explain their features (for example, the slope of the velocity graph).

2. In physics, *jerk* is defined to be the rate of change of acceleration with respect to time.
   (a) Describe, using a picture, how to calculate the instantaneous jerk of an object given the graph of its acceleration with respect to time. If acceleration is measured in $\mathrm{m/s^2}$, what are the units of jerk?
   (b) If an object has constant, positive jerk, what does the graph of its position with respect to time look like? Describe your answer as accurately as possible, and then justify it in one or two paragraphs.
   (c) [bonus] Describe what constant jerk feels like on the human body.

3. Consider the real valued function $f(x) = \sqrt{25 - x^2}$. Consider also a real valued function $g$ whose domain is $(-\infty, 3)$.
   (a) Find the domain of $f$.
   (b) Find the domain of $g \circ f$.