Part I (due at the beginning of class Wednesday, January 17)

In OpenStax *Calculus Volume 2*, read the first part of Section 2.2: Determining Volumes by Slicing, stopping when you get to the heading "Solids of Revolution." Answer the following reading questions in part (a) of your Part I answers.

1. Choose an object from your living space. Sketch a picture of the object. Write down what the object is and then describe the shape of a cross section of that object (feel free to sketch it) if you sliced the object vertically and what a cross section would look like if you sliced the object horizontally.
2. How is the slicing method for finding the volume of a solid related to using Riemann sums for finding the area of a 2-dimensional region?
3. In the solution to Example 2.6 (Deriving the Formula for the Volume of a Pyramid), what fact about similar triangles is being used?

Remember that what you turn in for Part I should have 3 parts, as mentioned in the syllabus:

(a) Your responses to the reading questions.

(b) Your own questions/comments on the reading.

(c) The amount of time you spent on Part I (including the time spent reading).

Part II: Exercises (prepare for class Wednesday, January 17)

Problems (c)–(f) on the green Area Between Curves handout.

Part III: Homework Problems (due Wednesday, January 17 at the beginning of class)

Review the guidelines and Sample Homework in the syllabus to make sure your Part III solutions follow them.

1. Following the same process we used to find the derivative of $\sinh^{-1} x$, find the derivative of the inverse trigonometic function $\arctan x$.
2. Find the following.
   (a) $\dfrac{d}{dx}\left(\operatorname{csch}^{-1}(e^x)\right)^4$
   (b) $\displaystyle\int \cosh(2x)(\sinh(2x))^2\,dx$

(c) $\int e^{-x} \sinh x \, dx$ (Hint: remember the definition of $\sinh x$.)

(d) $\int \dfrac{3}{\sqrt{5+16x^2}} \, dx$