Part I: (due at the beginning of class Wednesday, February 7)

Complete the yellow page labeled Trig Substitution that you got in class Monday.

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

(a) Your responses to the reading/watching questions below.

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

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

Part II

No Part II this time.

Part III: Homework Problems (due Wednesday, February 7 at the beginning of class)

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

1. Find the volume of the solid you get if you rotate the region bounded by $y = \tan^2 x$, $y = 0$, $x = \frac{\pi}{4}$, $x = 0$ around the x-axis.

2. If you cut a shape out of a stiff material and then try to balance it on a point (say the tip of a pencil, if the shape is small enough), the point inside the shape at which the shape balances perfectly is called the *centroid* of the shape.

   If a function $f(x)$ is positive and continuous on the interval $[a, b]$, then the centroid of the region between the graph of $f(x)$ and the x-axis on $[a, b]$ is the point $(\overline{x}, \overline{y})$, where

   $$\overline{x} = \frac{\int_a^b x f(x)\,dx}{\int_a^b f(x)\,dx} \text{ and } \overline{y} = \frac{\frac{1}{2}\int_a^b (f(x))^2\,dx}{\int_a^b f(x)\,dx}.$$

   Find the coordinates of the centroid of the region between $f(x) = \cos x$ and the x-axis on $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$.