

MATH 1351 TI-85 EXERCISE V
The sandwich theorem

Name: _____ SID: _____

We'll begin this exercise with a hypothetical situation. Suppose you're in your VW bug driving in the center lane down a three lane, one-way street. You notice there is a flat bed truck carrying a D-10 Caterpillar in the left lane just beside you, and a dump truck loaded with gravel in the right lane. Suddenly, without warning, the road becomes a two lane. What happens to you? _____

(Ouch)

With your TI-85 in **RADIAN MODE**, **SimulG** format, graph the three functions

$$y1 = 1 \qquad y2 = (\sin x)/x \qquad \& \qquad y3 = \cos x$$

on the same screen using the ZTRIG viewing window. We are interested in the relation between these three functions **near the value $x = 0$** . Thus choose the following values for the **RANGE**:

$$\mathbf{xMin = -3.15, xMax = 3.15, yMin = -1.5, and yMax = 1.5.}$$

In this viewing window what is the relation between the three graphs?_____

(This is the relation that is "proved" geometrically section 2.3 of the text.)

Use **TRACE** and move to the right (*right arrow*) until the value of x is 1. What is the corresponding value of y ?_____ Thus we are tracing which graph?_____ Now try the *arrow down* button. Where does the cursor go?_____ Notice the value of x remains the same but the value of y is now determined by the corresponding value of $y2$. What do you think will happen if you use the *arrow down* button again?_____ Were you right?_____ As you trace along the graph of $y3$ towards the value $x = 0$, what happens to the corresponding values of $y3$?_____ Since the values of $y2$ are "sandwiched between" those of $y3$ and $y1$, what must be happening to the values of $y2$ as x approaches 0?_____

Trace along the graph of $y3$ until the cursor is at $x = 0, y = 1$. Now *arrow up* once to the graph of $y2$. For $x = 0$, what is the corresponding value indicated for y on the graph of $y2$?_____ Explain._____

How close to 0 must we choose x if we want the value of $y2$ to be within .001 of 1?_____ Explain._____