

Action

- Return homework
x minutes
- Lessons on covariation
- Return homework from last week
- Discuss PLC question 050919 PLC A-H Prompt
- Discuss precalc book's approach to radian measure
- Discuss this week's homework
 - $y=\cos(x)$ -- What does x stand for? What does $\cos(x)$ stand for?
 - Juan's insight -- come back to it.
- Explanation of $\cos(a\sin(bx))$ behavior
 - Demonstrate the case of $\cos(10\sin(2x))$ using unit circle. Show the value of x on the unit circle. Then the value of $2x$. Ask teachers, "When you got a value of $10\sin(2x)$, did you think to use a unit circle to estimate the value of $\cos(10\sin(2x))$?"
 - Break it into parts-- $\sin(bx)$ cycles through its values b times as fast as $\sin(x)$. For every value of x , $a\sin(x)$ produces values that are a times as large as $\sin(x)$. Thus, $a\sin(bx)$ produces values between $-a$ and a as x varies from 0 to 2π and as bx varies from 0 to $2b\pi$. Therefore $\cos()$ is evaluated at values from 0 to $2b\pi$. When $a=1$, $\cos()$ is evaluated at values of its argument that varies between -1 and 1 . When $a=2$, $\cos()$ is evaluated at values of its argument between -2 and 2 , etc.
- Investigation of $\sin(x)+.001\cos(1000x)$ behavior
 - Graph $y=\sin(x)+.001\cos(1000x)$ and $y=.001\cos(1000x)$ (to get parallel windows). Rescale both to see what is going on microscopically. Pause to understand what we are seeing.
 - Graph $y=\sin x$ to see base graph. Discuss why the bumps are slanted and why they break where they do.
- Investigation of $(x^n)\sin(1/x)$

Reason

Still not done.

Marilyn will comment on them.

FOR NEXT WEEK -- REDO ONE OF 4, 5, OR 6 USING ONLY DEFINITIONS OF ANGLE MEASURE AND DEFINITIONS OF SINE AND COSINE. CREATE A WORKSHEET FOR YOUR STUDENTS THAT WILL SUPPORT THEIR SEEING AN ANGLE MEASURE AS SOMETHING THAT CAN BE PUT ON A NUMBER LINE

They distinguish between the radius and 1 radian (as if a radian measures the opening and the radius wraps onto circle giving a measure of the circle in units other than 1 radius.

Have them restate it and say why it is important. (The importance is that by emphasizing this view, they are helping students see $\sin()$ and $\cos()$ always as always tacitly involving a composition--but sometimes the argument is $f(x)=x$.)

They will have forgotten that arguments to trig functions are arc lengths. Having them go begin with the unit circle for the variable, and then put the value of the argument back onto the unit circle, will remind them of this.

More practice with the mantra, *Variables vary; go slow!*

Teachers must coordinate two functions as well as their sum. More practice with *variables vary, go slow!*

Action

- suggests that $x \cdot \sin(1/x)$ approaches 1 as x gets very large. Look at $u=1/x$. Then this is $(\sin u)/u$ as u gets very small. Why does this work? Look at small values of u in comparison to $\sin u$. They are almost the same length. HOWEVER, the ratio only approaches 1 if angles are measured in radians.
- QUIZLET
- Polar Coordinates
 - Laser pointer in a direction (laser pointer, measuring tape)
 - Two people, one at center the other at end of tape. A third person calculates the taper's distance from the center.
 - Look at some examples:
 - $r=5-2\theta$; $r=\min(6,20-\theta)$, etc.

Reason