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10-7-13

BC Calc **NAG it!!** **Ms. Falk**

Chapter 3 Section 3.5

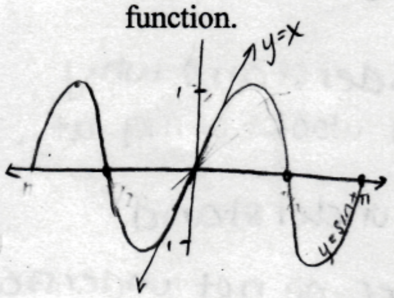
Definition:

Transcendental function, In mathematics, a function not expressible as a finite combination of the algebraic operations of addition, subtraction, multiplication, division, raising to a power, and extracting a root. Examples include the functions log *x*, sin *x*, cos *x*, *e*^x^ and any functions containing them.

Use a graphing calculator.

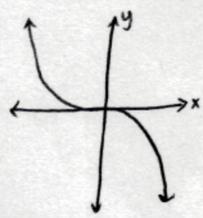
1. Find a polynomial that resembles f(x) = sin(x) near x = 0. Determine a domain of values for which your function and the given are closely related. Hint: try the "simplest" polynomial! Like, y = x. Provide a sketch below. Let Y1 be sin(x) and Y2 = your function.

domain: [-.3191..., .3829...]



2. Next, graph the difference between your function and f(x) = sin(x). What are the values of the differences as x approaches 0? Go to the table feature.

x	y
-1	.15853
-.5	.02057
0	0
.5	-.0206
1	-.1585



The differences between sinx and x approach 0 as the $\lim_{x\to 0}$

$(\sin x - x) \to 0$ as $x \to 0$

So they must be approaching each other.

3. How does modeling (NAG ing) the activity in (1) and (2) clarify your understanding of $\lim_{x\to 0}\frac{\sin(x)}{x}=1$ Be specific.

NAGing the activity in (1) and (2) clarifies my understanding of $\lim_{x\to 0}\frac{\sin(x)}{x}=1$ because the difference of sinx - x is getting smaller as it approaches 0 and each function individually get smaller as it approaches 0. They become the same thing and when numerator and denominator are the same thing it equals 1.

4. In the past, how did you used to think, or perhaps still do, about the limit above? Did you give it any thought or was it something just memorized?

I just memorized the ~~limit~~ and when I couldn't remember it I graphed ~~it~~.

IN class, many weeks ago I provided you with a geometric proof of the limit in question. This would satisfy the "A" of NAG. Review the proof in your notes, or find it in your text or any other source. We used the Squeeze or pinching Theorem in a geometry setting.

5. **Reflection:** how did NAGing the problem help to clarify your thinking about $\lim_{x \to 0} \frac{\sin(x)}{x} = 1$

NAGing the problem helped me understand why the answer to $\lim_{x \to 0} \frac{\sin x}{x} = 1$, because when I ~~look~~ looking at it graphically and algebraically it helps me understand why how, instead of just what it is. I still however do not understand how it can be solved numerically

Lets go over the table in #2.

Differentiation implies local linearization.

6. How do you think the derivatives of y = sin(x) and y = x will behave near x = 0?

So in other words, is $\frac{d}{dx}\sin(x) = 1$? for x near 0? How close to 0 does x need to be will b ea looming question for the future.

two function behave the same near 0 so the derivatives should be the same near 0.