AP Calc BC Update Thursday March 26th

This will be my last posted update on the website. I will be moving over to Haiku as it offers more opportunity for discussion and I may experiment with some videos there.

It seems like we have been off for more than 2 weeks. There is still plenty of time to prepare for the AP exam, so please consider taking next week completely off. Prayerfully, our nation will be better shape in 10 days when we start up again. Beginning April 6th, I will have a more daily structure approach to the class through Haiku. By then, we show have more details about the AP exam and about how grading will work through the remainder of the semester.

Mr. Tupaj

Here is an overview of the Chapter 9 FRQ's

The answers are posted but please try them first.

Classwork #1

You need to get used to some of the notation. The question is easier than it looks. Part a is just a radius of convergence, no endpoint tests needed. Set up a ratio test, do the limit, put the result between -1 and 1, remember the radius is half the distance between the endpoints.

In part b, the first three terms are given, so just differentiate them. You need to generate the 4th term using the formula. Remember that the ONLY series that can be expressed as functions are power series. The sum is a1 / (1-r). If you can identify the multiplier (r) and the first term, then you can write the function. Note the problem never tells you it is a power series. You need to recognize that.

Part C is a little different. You should know the series for e^x. We never multiplied two series together before. But, you only need the first 4 nonzero terms and it tells you that you are only going to the third degree, so just multiply the first term of one series by each term of the other and stop what you get to x^3. You may get more than four terms, but then you can combine terms with the same power.

Classwork #2

Part a is a backwards version of part 1 in problem #2. You need to know to set up a ratio test and do the limit. You then need to get (x – 1) by itself instead of just x to find R.

In part b, you are allowed to differentiate the general formula to find the series for f '. I would suggest doing that first and using the result to generate the terms. The other way to go is to generate the terms of f(x) and then differentiate each term. Again, an easy question that looks hard.

In part c, like part b of question 1, when asked for a function, the series must be geometric. This time you are told, but they did not have to tell you. Look at your answer to part b and find r and the first term to set up the function for f ' (x). To get from f'(x) to f(x) you need to integrate, but you cannot integrate an infinite number of terms, so you need to integrate the function you just found (watch out for u-substitution). You also need an initial condition when you integrate. Think of an easy value you can substitute for x in the original formula.

Classwork #3

Part a is easy but we never did one like this. You can set up a simple polynomial from the given values then the give you the value of the polynomial when x = ½. Substitute, set = to -3 and solve for f'(0).

Now that you have the first derivative value, part b is a straightforward generic Taylor series.

Part c is a straightforward integration of each term of f(x) with the twist that x needs to first be replaced by 2x. I suggest simplifying first before integrating. Note to get degree three, you only need the series up to degree 2 because you are integrating. Don't forget the initial condition.

Classwork #4

Part a is a straightforward manipulation of a given series.

Part b is tricky. You know the center is zero because it is Maclaurin and the radius is given as one.

So $-1 < x < 1$. To get the interval, you need to check the endpoints. Plug in 1 and -1 into the given formula and determine if these value result in convergent or divergent series. Easy but hard to remember the need to do this.

A lot of tedious manipulations in part c but pretty basic

In part d, when you are told that it is alternating the error bound is just the next term value. The different between the actual (g(1)) and the approximate (your answer to the end of part c) must be less than the bound which is the found by plugging x = 1 into the third term (since your approximation in part c was for the first two nonzero terms. Confirm that this value is less then 1/5.

On Monday, April 6th, I will start setting up some individual discussion for questions that arise from these classwork problems. For now, take next week off and stay well.

Mr. Tupaj