

Due November 30

Study Group MembersName

Only write on one side of each page.

I encourage you to work with others in the class on this quiz. As with all writing you should work out the details in a draft before writing a final solution. Be sure to follow the 5 basic guidelines listed in the course information sheet unless explicitly directed to do otherwise in the problem statement. You do not need to include every algebra or arithmetic step but you should include enough detail to allow a member of your target audience to reconstruct any missing steps. Be sure to include in-line citations, with page numbers if appropriate, every time you use the results of discussion, a text, notes, or technology. If you include graphs, they should be done carefully on graph paper. Finally, there is to be no collaboration in the writing of your solution even if you worked out the details with other people.

“It is hard to know what you are talking about in mathematics, yet no one questions the validity of what you say. There is no other realm of discourse half so queer.” – J. R. Newman

1 Problems

1.1 Do any one (1) of the following.

1. A function f is defined by

$$f(x) = 1 + 2x + x^2 + 2x^3 + x^4 + 2x^5 + \dots$$

That is, the coefficients are $a_{2k} = 1$ and $a_{2k+1} = 2$ for all $k \geq 0$.

- (a) Find the interval of convergence of the series.
 - (b) Find an explicit formula for $f(x)$ in terms of more familiar functions.
2. Suppose the series $\sum a_k x^k$ has radius of convergence 2 and the series $\sum b_k x^k$ has radius of convergence 3. What is the radius of convergence of the series

$$\sum (a_k + b_k) x^k ?$$

Explain.