

MAT334, COMPLEX VARIABLES, SUMMER 2020. PROBLEMS FOR JULY 6 – 10

Due Tuesday, July 14, at 3:30 PM EDT.

1. Using the formulas in Goursat, §§35, 37, find the Laurent series for

$$f(z) = \frac{\sin z}{z}$$

around $z = 0$. How does this series compare to the Taylor series for $\sin z$ around $z = 0$? On what set does it converge? Justify your answer.

2. Again using the formulas in Goursat, §§35, 37, find the Laurent series for

$$f(z) = \frac{e^z}{(z-2)^2}$$

around $z = 2$. How does this compare to the Taylor series for e^z around $z = 2$? [Hint: recall that $e^{a+b} = e^a e^b$; can you use this to find the Taylor series?] On what set does this Laurent series converge? Again, justify your answer.