

Quiz

DIS 203 and 210

March 12th

1. Write down $e^{0.001}$ correct to seven places after the decimal. Hints.¹
2. Write down the general solution of

$$(1 + 2x^2 + x^4)f'(x) + (2x + 2x^3)f(x) = 1.$$

Hints.²

3. Write down a power series

$$f(x) = \sum_{k=0}^{\infty} c_k x^k$$

that solves the differential equation $f'''(x) = f(x)$, $f(0) = 1$, $f'(0) = 0$, $f''(0) = 0$, and convince me that your solution is correct. Hints.³

Write your name and your answers below, or on the back of this page.

¹Use the first three terms of the Maclaurin series for $\exp(x)$.

²Convert to a linear equation. It might help to factor $(1 + 2x^2 + x^4)$ and $(2x + 2x^3)$.

³If you look at successive derivatives of f , they repeat. You can figure out from the given information what $f^{(n)}(0)$ is for any n , and therefore write down the Maclaurin series. This tells you what the answer is, but logically speaking it doesn't tell you why the answer is correct, so be careful!