QUIZ 3 (MATH 1B)

Problem 1. *Find the Maclaurin series of* $f(x) = \frac{1}{\sqrt{5-x}}$.

Problem 2. *Evaluate* $\int_0^1 e^{-x^2}\,dx$ *correct to within an error of* 0.001. *[Hint: Use Taylor expansion, then use the Alternating Estimation Theorem.]*

Problem 3. *Solve the differential equation* $\frac{dy}{dx} = \frac{x^5+1}{x^3y^2+y^4x^3}$.

Problem 4. *Suppose that a population develop according to the logistic equation* $dP/dt = 0.06P - 0.0006P^2$, *where* t *is measured in weeks. (a) What is the carrying capacity? (b) What is the value of* k*? (c) What are the equilibrium solutions. (d) If the initial population is* 50, *what is the population after* 10 *weeks?*

Problem 5. *Solve the first-order linear differential equations:*

(1) $y' - y = e^x$

(2) $y' + 2xy = 1$.