

Extra credit problems. Math 308/509.

Due date: 4 March 2009

These problems need to be separate from the regular homework.

Problem 1 (3pts). Prove that the following differential operator is not linear:

$$T[y] = (\cos x) \frac{d^9 y}{dx^9} + (y + x) \frac{d^2 y}{dx^2} + 3y.$$

Problem 2 (3pts). Determine whether the following two functions are linearly independent:

$$y_1(x) = \sin(x) - \ln 9 \quad y_2(x) = (y_1(x))^{(1002)} + 2 \ln 3.$$

Here $f^{(n)}$ denotes the n -th derivative.