

MATH 54 SUMMER 2017, QUIZ 30

- (a) Find all eigenvectors of $\frac{d^3}{dx^3} - 9\frac{d^2}{dx^2} + 27\frac{d}{dx}$ with eigenvalue 27. [Hint: the polynomial $t^3 - 9t^2 + 27t - 27$ can be factored as $(t - 3)^3$.]

- (b) Use your answer to part (a) to find a nontrivial solution to the following PDE.

$$\frac{\partial f}{\partial t} = \frac{\partial^3 f}{\partial x^3} - 9\frac{\partial^2 f}{\partial x^2} + 27\frac{\partial f}{\partial x}$$