

# Quiz 9

MA 262  
Artur's Class

2014/10/30

## Problem 1

Consider the following matrix.

$$\mathbf{M} = \begin{pmatrix} 2 & 1 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 3 \end{pmatrix}.$$

- (a) Compute the characteristic polynomial.
- (b) Compute the eigenvalues.
- (c) Determine the algebraic multiplicities.
- (d) Compute the geometric multiplicities. Are they different from (c)?

## Problem 2

Consider the following differential equation.

$$\frac{d^7 y}{dx^7} + e^{i2\pi x} \frac{dy}{dx} - y = 0.$$

What is the dimension of the solution space?

(**Hint:** Look at what I'm asking. Don't do more work than required.)