

## Association Schemes: Pre-enrolment Readiness Quiz

This quiz checks whether you are comfortable with the small amount of linear algebra needed at the start of the unit. No prior knowledge of association schemes is assumed.

### Question 1

What can you say about the eigenvalues of a real symmetric matrix?

### Question 2

List all of the elementary  $3 \times 3$  matrices having one 1 and all other entries equal to 0. Which ones are idempotent and which ones are nilpotent?

### Question 3

Suppose  $A$  and  $B$  are real symmetric matrices and  $AB = BA$ .

Which of the following is true?

1.  $A$  and  $B$  must be equal.
2.  $A$  and  $B$  can be simultaneously diagonalised by an orthogonal matrix.
3.  $AB$  must be the zero matrix.
4.  $A + B$  must be invertible.