

# Information about the MAS277 exam

Two past papers for the course are on the course web page, along with solutions. These papers are a good general guide to the style and content of this year's paper. Questions set in tutorials and for homework are also a useful guide.

The paper will consist of *five* questions, and you should do *four* of them (if you do all of them, only your best four will be counted).

Questions consist of a mixture of bookwork (definitions, statements and proofs) and questions applying bookwork. You should therefore learn some of this bookwork.

The proofs you could be asked to give (listed below) are the sort which work in the obvious way from the relevant definitions. If you know the definitions and understand what is going on, it shouldn't really be necessary to learn these proofs by heart.

Here is a list of results you could be asked for in your exam:

**Statements and Proofs:** 1.21, 1.29, 1.55, 1.56, 1.57, 2.23, 2.26, 2.32, 3.20.

**Statements only:** 1.49, 1.54, 1.58, 2.10, 3.7, 3.23, 3.24.

**Definitions:** subspaces (1.10 and 1.11), direct sum (1.25), linear combinations and independence (1.28), spanning sets (1.35 and 1.36), finite-dimensional (1.42), basis (1.45), dimension (1.48), linear maps (2.1), kernels and images (2.20), isomorphism (2.27), inner products (3.1), angle (3.11), orthogonal and orthonormal (3.14), adjoint (3.31).

You should also know:

- standard bases for the standard vector spaces (such as  $\mathbb{R}^n$ , and spaces of polynomials and matrices);
- standard examples of inner products (for spaces such as  $\mathbb{R}^n$ , and spaces of polynomials, matrices and functions);
- how to write down the matrix of a linear map with respect to given bases;
- how to apply the Gram-Schmidt process;
- how to calculate distances and angles in an inner product space;
- the standard trigonometric identities needed in the usual type of Fourier theory questions (see handout).