Selected mathematical (examination-style) topics in ERM

This section includes material on a selected range of mathematical topics of the sort that ERM students might come across in more mathematically orientated exam or coursework questions:

- Moments of a binomial loss distribution
- Coefficient of tail dependence of a Clayton copula
- Deriving the principal components of two uncorrelated return series
- Finding the most important principal component
- Identifying a formula for the (lower) conditional tail expectation (CTE) of a normal distribution that does not explicitly include integral signs but instead refers to the unit normal density function and the unit normal cumulative distribution function
- Estimating operational risk capital requirements assuming data follows a gamma distribution (using the method of moments)
- Estimating operational risk capital requirements assuming data follows a triangular distribution (using maximum likelihood)
- Estimating operational risk capital requirements assuming data follows a bi-exponential distribution
- The simplest factor structures for a risk model
- Showing that a Gaussian copula is not in general an Archimedean copula
- Showing that the Mean Excess Function of a Generalised Pareto Distribution is linear in the exceedance threshold (for a specific range of values of the distribution's shape parameter)
- Showing that VaR is not coherent for exponentially distributed loss variables