Foundations of Numerical Methods
(2^{nd} term 2005)

Exercise Sheet 5 - Systems of linear equations/interpolation

1. Use the Cholesky algorithm to find a factorization of the form LL^T to find a factorization for the matrix

$$A = \begin{bmatrix} 2 & -1 & 0 \\ -1 & 2 & -1 \\ 0 & -1 & 2 \end{bmatrix}$$

2. Use the Crout factorization to solve the tridiagonal system below

$$\begin{array}{cccc} 2x_1 & +x_2 & & = 3 \\ x_1 & +2x_2 & +x_3 & = -2 \\ & 2x_2 & +3x_3 & = 0 \end{array}$$

3. Use the following values, and four-digit rounding arithmetic to construct a third Lagrange interpolating polynomial:

x	$f(x)$
1.00	0.1924
1.05	0.2414
1.10	0.2933
1.15	0.3492

Compute $f(1.09)$