

SECOND MIDTERM EXAMINATION
(sample)

The student must justify each answer; a correct answer without the argument leading to it will not be taken into account.

- 1 (Worth 10 pts) The following system of linear equations

$$x + 2y + 3z = 1670$$

$$2x + 2y + 3z = -47$$

$$3x + 2y + z = 1245$$

has only one solution (x, y, z) . Without computing the solution explain why it is unique.

- 2 (Worth 5 pts) Find values of a, b, c such that the matrix

$$M = \begin{pmatrix} a & 0 & c \\ 0 & b & 0 \\ a & 0 & -c \end{pmatrix}$$

is orthogonal.

- 3 (Worth 10 pts) 1) Find the value of x such that the matrix

$$B = \begin{pmatrix} 1 & 2 & 3 \\ 2 & x & 0 \\ 3 & 0 & 1 \end{pmatrix}$$