

# Take-Home Quiz 6

(Due at 7:00 p.m. on Fri. October 19, 2007)

Division:

ID#:

Name:

Let  $A$ ,  $\mathbf{x}$ ,  $\mathbf{b}$  and  $T$  be as follows, where  $a$ ,  $b$ ,  $c$  and  $d$  are arbitrary numbers.

$$A = \begin{bmatrix} 2 & -2 & -4 & 0 \\ -3 & 5 & 4 & 5 \\ 4 & 2 & -5 & 3 \\ 5 & -7 & -3 & 0 \end{bmatrix}, \quad \mathbf{x} = \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix}, \quad \mathbf{b} = \begin{bmatrix} 3 \\ -2 \\ 1 \\ 0 \end{bmatrix}, \quad \text{and } T = \begin{bmatrix} a & b & c & c \\ b & a & c & c \\ c & c & a & b \\ c & c & b & a \end{bmatrix}$$

1. In the following we consider the equation  $A\mathbf{x} = \mathbf{b}$ .

(a) Evaluate  $\det(A)$ , and determine whether there is no solution, exactly one solution or infinitely many solutions.

(b) By Cramer's rule express  $x_3 = \frac{\det(B)}{\det(A)}$  as a fraction of two determinants. Write down the matrix  $B$  in the numerator.

(c) Evaluate  $\det(B)$  in the previous problem and find  $x_3$ .

2. Evaluate the determinant of  $T$ .

Message 欄：数学（または他の科目）など何かを学んでいて感激したことについて。  
[HP 掲載不可は明記のこと]