

Last Name: SOLUTIONS

First Name: _____

Student ID: _____

Quiz 5 (A)

Question 1. (3 marks) Let:

$$A = \begin{bmatrix} 4 & -1 & 2 \\ 5 & 0 & -2 \\ 4 & 1 & 1 \end{bmatrix}$$

Find C_{23} .

$$C_{23} = (-1)^{2+3} \det \begin{bmatrix} 4 & -1 \\ 4 & 1 \end{bmatrix} = -(4+4) = -8$$

Question 2. (3 marks) Find the following determinants (justify your answer):

$$(a) A = \begin{bmatrix} 2 & 6 & 0 & -2 \\ 3 & -2 & 3 & 0 \\ 1 & 3 & 0 & -1 \\ 4 & 0 & 1 & 0 \end{bmatrix} \quad (b) B = \begin{bmatrix} 2 & 0 & 0 & 0 \\ 3 & -2 & 0 & 0 \\ 0 & 3 & 1 & 0 \\ 7 & 0 & 1 & -3 \end{bmatrix} \quad (c) C = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 \\ 0 & 0 & 1 & 0 \\ 0 & 1 & 0 & 0 \end{bmatrix}$$

$$\det A = 0$$

$$(R_1 = 2R_3)$$

$$\det B = (2)(-2)(1)(-3)$$

$$= 12$$

(LOWER TRIANGULAR)

$$\det C = -1$$

($I \ R_2 \leftrightarrow R_3 \ C$
ELEMENTARY
MATRIX)

Question 2. (4 marks) Find the following determinant:

$$\det \begin{bmatrix} 2 & 1 & 0 & 1 \\ 1 & -2 & 1 & 0 \\ 2 & -1 & 0 & 3 \\ 0 & 2 & 0 & 1 \end{bmatrix} \equiv 0 - \det \begin{bmatrix} 2 & 1 & 1 \\ 2 & -1 & 3 \\ 0 & 2 & 1 \end{bmatrix} + 0 - 0$$

(Row 3)

$$= - (0 - 2 \det \begin{bmatrix} 2 & 1 \\ 2 & 3 \end{bmatrix} + (1) \det \begin{bmatrix} 2 & 1 \\ 2 & -1 \end{bmatrix})$$

$$= - (-2(6-2) + (-2)(-2))$$

$$= -(-8 - 4)$$

$$= 12$$