姓名: SOLUTION　　葉均承　　應數一線性代數

學號: _____　　**Quiz 13**　　考試日期: 2024/12/18

不可使用手機、計算器，禁止作弊!

1. Let A be a 7×7 matrix with row vectors $\vec{a}, \vec{b}, \vec{c}, \vec{d}, \vec{e}, \vec{f}, \vec{g}$ and with determinant equal to 20. Find the determinant of the following matrices.

   (a) B is the matrix having row vectors $(\vec{a} + 5\vec{g}), (3\vec{a} + 7\vec{b} + 5\vec{c}), \vec{b}, (\vec{d} - 9\vec{e}), \vec{e}, \vec{f}, \vec{g}$.

   $det(B)$= **-100**

   (b) C is the matrix having row vectors $(\vec{c} + \vec{c}), (\vec{b} + \vec{c}), (\vec{a} + \vec{c}), (\vec{d} - \vec{f}), \vec{e}, \vec{f}, \vec{g}$.

   $\det(C)$= **-40** .

   (c) Let D is A^{-1}. $\det(D)$= **1/20** .

   (d) Let E is A^T. $\det(EA)$= 400 .

   (e) Let F is $5A$. $\det(F)$= $5^7 \times 20$.

   Solution：

   Let's present the matrices graphically.

$$A = \begin{bmatrix} - & \vec{a} & - \\ - & \vec{b} & - \\ - & \vec{c} & - \\ - & \vec{d} & - \\ - & \vec{e} & - \\ - & \vec{f} & - \\ - & \vec{g} & - \end{bmatrix}$$

   Similar to 112-1 quiz 15.

2. Prove or disprove the following:

(a) True **False** The product of a suqare matrix and its adjoint is the identity matrix.

Solution：

4-3 problem 35 (g)

(b) **True** False Let A be an $n \times n$ matrix, then $\det(adj(A)) = \det(A)^{n-1}$.

Solution：

4-3 problem 38