Division: **ID#:** **Name:**

Let A and B be the 5×5 matrices given below.

$$A = \begin{bmatrix} 2 & 0 & -3 & 1 & 4 \\ -2 & 2 & -1 & -3 & 2 \\ -3 & -1 & 0 & 4 & 1 \\ 2 & 2 & 1 & 3 & -2 \\ -2 & -3 & 3 & -2 & 4 \end{bmatrix}, \quad B = \begin{bmatrix} a & b & b & b & b \\ b & a & b & b & b \\ b & b & a & b & b \\ b & b & b & a & b \\ b & b & b & b & a \end{bmatrix}.$$

1. Find the numbers x, y and z. (Solutions only.)

$$\det(A) = x \cdot \begin{vmatrix} 2 & 2 & 1 & 3 & -2 \\ 8 & 6 & 0 & 10 & -2 \\ 0 & 4 & 0 & 0 & 0 \\ -3 & -1 & 0 & 4 & 1 \\ -8 & -9 & 0 & -11 & 10 \end{vmatrix} = y \cdot \begin{vmatrix} 8 & 6 & 10 & -2 \\ 0 & 1 & 0 & 0 \\ -3 & -1 & 4 & 1 \\ -8 & -9 & -11 & 10 \end{vmatrix} = z \cdot \begin{vmatrix} 4 & 5 & -1 \\ -3 & 4 & 1 \\ -8 & -11 & 10 \end{vmatrix}.$$

$$x = \qquad, \quad y = \qquad, \quad z = \qquad.$$

2. Find $\det(A)$. (Show work.)

3. Explain why the following equalities hold.

$$\det(B) \overset{(1)}{=} \begin{vmatrix} a+4b & a+4b & a+4b & a+4b & a+4b \\ b & a & b & b & b \\ b & b & a & b & b \\ b & b & b & a & b \\ b & b & b & b & a \end{vmatrix} \overset{(2)}{=} (a+4b) \begin{vmatrix} 1 & 1 & 1 & 1 & 1 \\ b & a & b & b & b \\ b & b & a & b & b \\ b & b & b & a & b \\ b & b & b & b & a \end{vmatrix}.$$

4. Find the condition that B is invertible.

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]