

Quiz 6

This quiz is graded out of 10 marks. No books, calculators, notes or cell phones are allowed. You must show all your work, the correct answer is worth 1 mark the remaining marks are given for the work. If you need more space for your answer use the back of the page.

Question 1. (5 marks) If

$$A = \begin{bmatrix} 2 & 1 & -2 & 1 & 0 \\ 4 & 3 & 1 & 0 & 0 \\ 0 & 0 & 5 & -2 & 1 \\ 0 & 0 & 2 & -5 & 3 \\ 0 & 0 & 0 & 0 & 2 \end{bmatrix} \sim \begin{matrix} -2R_1 + R_2 \rightarrow R_2 \\ 5R_4 \end{matrix} \begin{bmatrix} 2 & 1 & -2 & 1 & 0 \\ 0 & 1 & 5 & -2 & 0 \\ 0 & 0 & 5 & -2 & 1 \\ 0 & 0 & 10 & -25 & 15 \\ 0 & 0 & 0 & 0 & 2 \end{bmatrix}$$

then compute $\det(A)$ using elementary operations.

$$\sim \begin{matrix} -2R_3 + R_4 \rightarrow R_3 \end{matrix} \begin{bmatrix} 2 & 1 & -2 & 1 & 0 \\ 0 & 1 & 5 & -2 & 0 \\ 0 & 0 & 5 & -2 & 1 \\ 0 & 0 & 0 & -21 & 11 \\ 0 & 0 & 0 & 0 & 2 \end{bmatrix} = B$$

$$\det B = (5) \det A$$

$$(2)(1)(5)(-21)(2) = 5 \det A$$

$$-84 = \det A$$

Question 2. (5 marks) If

$$A = \begin{bmatrix} a & b & c \\ d & e & f \\ g & h & i \end{bmatrix}, B = \begin{bmatrix} 2c & -b & a+b \\ 2f & -e & d+e \\ 2i & -h & g+h \end{bmatrix}$$

$$A \sim \begin{matrix} C_1 \leftrightarrow C_3 \\ 2C_1, -C_2, C_3 + C_2 \rightarrow C_3 \end{matrix} \begin{bmatrix} c & b & a \\ f & e & d \\ i & h & g \end{bmatrix} \sim \begin{bmatrix} 2c & -b & a+b \\ 2f & -e & d+e \\ 2i & -h & g+h \end{bmatrix}$$

and $\det(A) = \frac{1}{\sqrt{2}}$ then compute $\det(B)$.

||

B

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

$$= \frac{2}{\sqrt{2}}$$