

Quiz 8

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. §2.2 #26 (5 marks) Evaluate the determinant

$$\det \left(\begin{bmatrix} -3a & -3b & -3c \\ d & e & f \\ g-4d & h-4e & i-4f \end{bmatrix} \right)$$

given that

$$\det \left(\begin{bmatrix} a & b & c \\ d & e & f \\ g & h & i \end{bmatrix} \right) = -6$$

$$\underbrace{\begin{bmatrix} a & b & c \\ d & e & f \\ g & h & i \end{bmatrix}}_{A=} \sim \begin{matrix} -3R_1 \rightarrow R_1 \\ -4R_2 + R_3 \rightarrow R_3 \end{matrix} \underbrace{\begin{bmatrix} -3a & -3b & -3c \\ d & e & f \\ g-4d & h-4e & i-4f \end{bmatrix}}_{=B}$$

(op. that change det.) $\det [\text{original mat.}] = \det [\text{new mat.}]$

$$(-3) \det A = \det B$$

$$(-3)(-6) = \det B$$

$$18 = \det B$$

Question 2. §2.2 #14 (5 marks)

$$A = \begin{bmatrix} 1 & -2 & 3 & 1 \\ 5 & -9 & 6 & 3 \\ -1 & 2 & -6 & -2 \\ 2 & 8 & 6 & 1 \end{bmatrix} \sim \begin{matrix} -5R_1 + R_2 \rightarrow R_2 \\ R_1 + R_3 \rightarrow R_3 \\ -2R_1 + R_4 \rightarrow R_4 \end{matrix} \begin{bmatrix} 1 & -2 & 3 & 1 \\ 0 & 1 & -9 & -2 \\ 0 & 0 & -3 & -1 \\ 0 & 12 & 0 & -1 \end{bmatrix}$$

$$\sim \begin{matrix} -12R_2 + R_4 \rightarrow R_4 \end{matrix} \begin{bmatrix} 1 & -2 & 3 & 1 \\ 0 & 1 & -9 & -2 \\ 0 & 0 & -3 & -1 \\ 0 & 0 & 108 & 23 \end{bmatrix}$$

$$\sim \begin{matrix} 36R_3 + R_4 \rightarrow R_4 \end{matrix} \begin{bmatrix} 1 & -2 & 3 & 1 \\ 0 & 1 & -9 & -2 \\ 0 & 0 & -3 & -1 \\ 0 & 0 & 0 & -13 \end{bmatrix} = B$$

(op. that change det.) $\det [\text{orig. mat.}] = \det [\text{new mat.}]$
 $\det A = \det B = 39$