

Quiz 3

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. §1.3 Consider the matrices

$$A = \begin{bmatrix} 3 & 0 \\ -1 & 2 \\ 1 & 1 \end{bmatrix}, B = \begin{bmatrix} 4 & -1 \\ 0 & 2 \end{bmatrix}, C = \begin{bmatrix} 1 & 4 & 2 \\ 3 & 1 & 5 \end{bmatrix}, D = \begin{bmatrix} 1 & 5 & 2 \\ -1 & 0 & 1 \\ 3 & 2 & 4 \end{bmatrix}, E = \begin{bmatrix} 6 & 1 & 3 \\ -1 & 1 & 2 \\ 4 & 1 & 3 \end{bmatrix}$$

In each part, compute the given expression (where possible).

#3f. (2 marks) $2E - 2D$

#4i. (3 marks) $(CD)E$

#5b. (2 marks) BA

#3f) $2E - 2D = 2 \begin{bmatrix} 6 & 1 & 3 \\ -1 & 1 & 2 \\ 4 & 1 & 3 \end{bmatrix} - 2 \begin{bmatrix} 1 & 5 & 2 \\ -1 & 0 & 1 \\ 3 & 2 & 4 \end{bmatrix} = \begin{bmatrix} 10 & -8 & 2 \\ 0 & 2 & 2 \\ 2 & -2 & -2 \end{bmatrix}$

#4i) $(CD)E = \left(\begin{bmatrix} 1 & 4 & 2 \\ 3 & 1 & 5 \end{bmatrix} \begin{bmatrix} 1 & 5 & 2 \\ -1 & 0 & 1 \\ 3 & 2 & 4 \end{bmatrix} \right) \begin{bmatrix} 6 & 1 & 3 \\ -1 & 1 & 2 \\ 4 & 1 & 3 \end{bmatrix}$

$$= \begin{bmatrix} 3 & 9 & 14 \\ 17 & 25 & 27 \end{bmatrix} \begin{bmatrix} 6 & 1 & 3 \\ -1 & 1 & 2 \\ 4 & 1 & 3 \end{bmatrix} = \begin{bmatrix} 65 & 26 & 69 \\ 185 & 69 & 182 \end{bmatrix}$$

#5b $B_{2 \times 2} A_{3 \times 2}$ undefined since the # columns of B is not equal to the # rows of A

Question 2. §1.3 #16 (3 marks) Find all values of k , if any, that satisfy the equation.

$$\begin{bmatrix} 2 & 2 & k \end{bmatrix} \begin{bmatrix} 1 & 2 & 0 \\ 2 & 0 & 3 \\ 0 & 3 & 1 \end{bmatrix} \begin{bmatrix} 2 \\ 2 \\ k \end{bmatrix} = 0$$

$$\begin{bmatrix} 2 & 2 & k \end{bmatrix} \begin{bmatrix} 6+2k \\ 4+3k \\ 6+k \end{bmatrix} = 0$$

$$[0] = [2(6+2k) + 2(4+3k) + k(6+k)]$$

$$[0] = [12+4k + 8+6k + 6k+k^2]$$

$$[0] = [k^2 + 12k + 20]$$

$$k^2 + 12k + 20 = 0$$

$$(k+2)(k+10) = 0$$

$$\begin{array}{l} / \\ k+2=0 \\ k=-2 \end{array}$$

$$\begin{array}{l} \backslash \\ k+10=0 \\ k=-10 \end{array}$$