

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. §1.6 #16 (5 marks) Determine conditions on the b_i 's, if any, in order to guarantee that the linear system is consistent.

$$\begin{aligned}x_1 - 2x_2 - x_3 &= b_1 \\- 4x_1 + 5x_2 + 2x_3 &= b_2 \\- 4x_1 + 7x_2 + 4x_3 &= b_3\end{aligned}$$

Question 2. §1.7 #23 (2 marks) Find all values of the unknown constant(s) in order for A to be symmetric.

$$\begin{bmatrix} 4 & -3 \\ a+5 & -1 \end{bmatrix}$$

Question 3. §1.7 #37a (3 marks) A square matrix A is called *skew-symmetric* if $A^T = -A$. Prove: If A is an invertible skew-symmetric matrix, then A^{-1} is skew-symmetric.

Question 4. (5 marks) Consider the matrices:

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

Solve for X if possible.

$$C((DX)^T - 2I)^{-1} = C$$