

Quiz 1

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. §1.1 #1b (1 mark) Determine whether the equation is linear in $x_1, x_2,$ and x_3 :

$x_1 + 3x_2 + x_1x_3 = 2$ is not linear because of the term x_1x_3 .

Question 2. §1.1 #2d (1 mark) Determine whether the equations form a linear system.

$$\begin{array}{rcl} 3z + x & = & -4 \\ y + 5z & = & 1 \\ 6x + 2z & = & 3 \\ -x - y - z & = & 4 \end{array}$$

is a linear system since all equations are linear.

Question 3. §1.1 #11b (2 marks) Find a system of linear equations corresponding to the given augmented matrix.

$$\left[\begin{array}{ccc|c} 3 & 0 & -2 & 5 \\ 7 & 1 & 4 & -3 \\ 0 & -2 & 1 & 7 \end{array} \right]$$

$$\begin{array}{r} 3x_1 - 2x_3 = 5 \\ 7x_1 + x_2 + 4x_3 = -3 \\ -2x_2 + x_3 = 7 \end{array}$$

Question 3. §1.1 #14c (2 marks) Find the augmented matrix for the given system of linear equations

$$\begin{array}{rcl} x_1 + 2x_2 - x_4 + x_5 & = & 1 \\ 3x_2 + x_3 - x_5 & = & 2 \\ x_3 + 7x_4 & = & 1 \end{array}$$

$$\left[\begin{array}{ccccc|c} 1 & 2 & 0 & -1 & 1 & 1 \\ 0 & 3 & 1 & 0 & -1 & 2 \\ 0 & 0 & 1 & 7 & 0 & 1 \end{array} \right]$$

Question 4. §1.2 #2g (2 marks) Determine whether the matrix is in row echelon form, reduced row echelon form, both, or neither.

$\left[\begin{array}{cccc} 1 & -2 & 0 & 1 \\ 0 & 0 & 1 & -2 \end{array} \right]$ is in both row echelon and reduced row echelon form

Question 5. §1.2 #4a (2 marks) Suppose that the augmented matrix for a system of linear equations has been reduced by row operations to the given row echelon form. Solve the system.

$$\left[\begin{array}{ccc|c} 1 & 0 & 0 & -3 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 7 \end{array} \right] \Leftrightarrow \left. \begin{array}{l} x_1 + 0x_2 + 0x_3 = -3 \\ 0x_1 + x_2 + 0x_3 = 0 \\ 0x_1 + 0x_2 + x_3 = 7 \end{array} \right\} \begin{array}{l} x_1 = -3 \\ x_2 = 0 \\ x_3 = 7 \end{array}$$