

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 #1d (1 mark) Determine whether the equation is linear in x_1 , x_2 , and x_3 :

$$x_1^{-2} + x_2 + 8x_3 = 5 \quad \text{not linear since } x_1 \text{ is to the power of } -2.$$

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

$$\begin{cases} -2x + 4y + z = 2 \\ 3x - \frac{2}{y} = 0 \end{cases} \quad \text{not a linear system since second equation is not linear (y to the power of } -1)$$

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

$$\left[\begin{array}{cccc|c} 7 & 2 & 1 & -3 & 5 \\ 1 & 2 & 4 & 0 & 1 \end{array} \right] \quad \begin{cases} 7x_1 + 2x_2 + x_3 - 3x_4 = 5 \\ x_1 + 2x_2 + 4x_3 = 1 \end{cases}$$

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

$$\begin{cases} 3x_1 - 2x_2 = -1 \\ 4x_1 - 5x_2 = 3 \\ 7x_1 + 3x_2 = 2 \end{cases} \quad \left[\begin{array}{cc|c} 3 & -2 & -1 \\ 4 & -5 & 3 \\ 7 & 3 & 2 \end{array} \right]$$

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

$$\left[\begin{array}{ccc} 1 & 3 & 4 \\ 0 & 0 & 1 \\ 0 & 0 & 0 \end{array} \right] \quad \text{is row echelon form but not reduced row echelon form since 2nd leading 1 is not the only non-zero entry in the column.}$$

Question 5. §1.2 #3d (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.

$$\left[\begin{array}{cccc} 1 & -3 & 7 & 1 \\ 0 & 1 & 4 & 0 \\ 0 & 0 & 0 & 1 \end{array} \right] \quad \text{No solution since } 0x_1 + 0x_2 + 0x_3 = 1 \quad 0 = 1 \quad \swarrow$$