

## 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  $x_3$ :

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

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

$$\begin{aligned} -2x + 4y + z &= 2 \\ 3x - \frac{2}{y} &= 0 \end{aligned} \quad \text{Not a linear system since } \frac{2}{y} \text{ makes the second equation non linear.}$$

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

$$\begin{bmatrix} 7 & 2 & 1 & -3 & 5 \\ 1 & 2 & 4 & 0 & 1 \end{bmatrix} \quad \begin{aligned} 7x_1 + 2x_2 + x_3 - 3x_4 &= 5 \\ x_1 + 2x_2 + 4x_3 &= 1 \end{aligned}$$

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

$$\begin{aligned} 3x_1 - 2x_2 &= -1 \\ 4x_1 - 5x_2 &= 3 \\ 7x_1 + 3x_2 &= 2 \end{aligned} \quad \begin{bmatrix} 3 & -2 & -1 \\ 4 & -5 & 3 \\ 7 & 3 & 2 \end{bmatrix}$$

**Question 4.** §1.1 #TFb (2 marks) Determine whether the statement is true or false, and justify your answer.

Multiplying a linear equation through by zero is an acceptable elementary row operation?

False, multiplying by zero eliminates an equation in the corresponding system, possibly changing the solution set.

**Question 5.** §1.1 #TFd (2 marks) Determine whether the statement is true or false, and justify your answer.

A single linear equation with two or more unknowns must always have infinitely many solutions?

True, as there will be an infinite possible linear combination that can satisfy the linear equation.