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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 #TF *(2 marks)* Determine whether the statement is true or false, and justify your answer.
The linear system

$$\begin{aligned} x - y &= 3 \\ 2x - 2y &= k \end{aligned}$$

cannot have a unique solution, regardless of the value of k.

True,

If $k=6$ then the two equations are identical, hence the two lines coincide and have infinitely many points in common. So infinitely many solutions

If $k \neq 6$ then the two lines are parallel but not identical, hence no points in common. So no solutions

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

$$\begin{bmatrix} 2 & 0 & 0 \\ 3 & -4 & 0 \\ 0 & 1 & 1 \end{bmatrix}$$

$$\begin{aligned} 2x &= 0 \\ 3x - 4y &= 0 \\ y &= 1 \end{aligned}$$

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

$$\begin{aligned} 2x_1 \quad\quad + 2x_3 &= 1 \\ 3x_1 - x_2 + 4x_3 &= 7 \\ 6x_1 + x_2 - x_3 &= 0 \end{aligned}$$

$$\begin{bmatrix} 2 & 0 & 2 & 1 \\ 3 & -1 & 4 & 7 \\ 6 & 1 & -1 & 0 \end{bmatrix}$$

Question 4. §1.1 #7a *(2 marks)* Determine whether the given vector (3, 1, 1) is a solution of the linear system

$$\begin{aligned} 2x_1 - 4x_2 - x_3 &= 1 \\ x_1 - 3x_2 + x_3 &= 1 \\ 3x_1 - 5x_2 - 3x_3 &= 1 \end{aligned}$$

$2(3) - 4(1) - 1 = 1 = RHS$ ✓
$3 - 3(1) + 1 = 1 = RHS$ ✓
$3(3) - 5(1) - 3(1) = 1 = RHS$ ✓

since the values satisfy all equations the vector is a solution to the system.

Question 5. §1.1 #4c *(2 marks)* Determine whether the following system is consistent.

$$\begin{aligned} x &= 4 \\ 2x &= 8 \end{aligned}$$

The system is consistent since $x=4$ is a solution.