

# Quiz 1

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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

$$x - y = 3$$

$$2x - 2y = k$$

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

True,

if  $k=6$  then  $x-y=3$   
 $2x-2y=6$

The two linear equations represent the same line.  
 $\therefore$  infinitely many solutions

if  $k \neq 6$  then  $x-y=3$   
 $2x-2y=k$

The two linear equations represent two parallel lines  
 $\therefore$  no solutions

**Question 2.** §1.1 #11a (2 marks) Find a system of linear equations corresponding 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

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

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

**Question 4.** §1.1 #8b (2 marks) Determine whether the given vector  $(\frac{5}{7}, \frac{22}{7}, 2)$  is a solution of the linear system

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

$$2\left(\frac{5}{7}\right) - 4\left(\frac{22}{7}\right) - 2 = \frac{10}{7} - \frac{88}{7} - \frac{14}{7} = \frac{-92}{7} \neq 1$$

$\therefore$  not a solution.

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

The linear system with corresponding augmented matrix

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

is consistent.

False, since  $0x + 0y = -1$  has no solutions.