

Name SOLUTION

Mathematics 1553

Quiz 2

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1. Find the reduced row echelon form of the following matrix. Show the matrix obtained after each row operation (you do not need to spell out which row operation you used).

$$\begin{pmatrix} 1 & 2 & 0 & 4 \\ 1 & 3 & 3 & 5 \\ 2 & 6 & 5 & 6 \end{pmatrix}$$

$$\rightsquigarrow \begin{pmatrix} 1 & 2 & 0 & 4 \\ 0 & 1 & 3 & 1 \\ 0 & 2 & 5 & -2 \end{pmatrix} \rightsquigarrow \begin{pmatrix} 1 & 0 & -6 & 2 \\ 0 & 1 & 3 & 1 \\ 0 & 0 & -1 & -4 \end{pmatrix}$$

$$\rightsquigarrow \begin{pmatrix} 1 & 0 & 0 & 26 \\ 0 & 1 & 0 & -11 \\ 0 & 0 & +1 & +4 \end{pmatrix}$$

Turn the page!

2. Suppose that we have a system of two linear equations in the variables x_1 , x_2 , and x_3 and that the reduced row echelon form of the associated augmented matrix is

$$\left(\begin{array}{ccc|c} 1 & 2 & 0 & 0 \\ 0 & 0 & 1 & 5 \\ 0 & 0 & 0 & 0 \end{array} \right)$$

(i) Write down a parametric form for the solution to this system of equations.

$$\begin{aligned} x_1 + 2x_2 &= 0 \\ x_3 &= 5 \end{aligned}$$

$$\begin{aligned} \rightarrow x_1 &= -2x_2 \\ x_2 &= x_2 \text{ free} \\ x_3 &= 5 \end{aligned}$$

$$(-2x_2, x_2, 5)$$

(ii) Which of the following best describes the solution set?

(a) a point in \mathbb{R}^2

(b) a line in \mathbb{R}^2

(c) a point in \mathbb{R}^3

(d) a line in \mathbb{R}^3

(e) a plane in \mathbb{R}^3