

Mathematics 1350H – Linear Algebra I: Matrix Algebra

TRENT UNIVERSITY, Summer 2017

Quizzes

Quiz #1. Wednesday, 10 May, 2017. [10 minutes]

Let $\mathbf{a} = \begin{bmatrix} -1 \\ 2 \\ -3 \end{bmatrix}$ and $\mathbf{b} = \begin{bmatrix} -1 \\ 1 \\ 1 \end{bmatrix}$ be vectors in \mathbb{R}^3 .

1. Find $\mathbf{a} + \mathbf{b}$ and $\mathbf{a} - \mathbf{b}$. [2]
2. Determine whether or not \mathbf{a} and \mathbf{b} are perpendicular to each other. [2]
3. Let $c = \frac{1}{\|\mathbf{a}\|}$. Without actually working out the numbers, what is $\|\mathbf{ca}\|$ equal to? [1]

Quiz #2. Monday, 15 May, 2017. [10 minutes]

Consider the three points $(1, 1, 2)$, $(1, 2, 1)$, and $(2, 1, 1)$ in \mathbb{R}^3 .

1. Sketch the axes of \mathbb{R}^3 , the three given points, and the triangle they make. [1]
2. Find a parametric representation of the plane passing through the given points. [2]
3. Find a linear equation representing the plane passing through the given points. [2]

Quiz #3. Wednesday, 17 May, 2017. [15 minutes]

1. Use the Gauss-Jordan method to find the point(s) of intersection, if any, of the planes in \mathbb{R}^3 given by the linear equations $x - y + z = 1$, $2x - y - z = 0$, and $x - 2y + 3z = 2$, respectively. [5]

Quiz #4. Wednesday, 24 May, 2017. [20 minutes]

1. Use the Gauss-Jordan method to find all the solutions, if any, of the following system of linear equations. [5]

$$\begin{array}{rccccrcr} 2x & - & y & + & 5z & - & 8w & = & 6 \\ x & - & 2y & + & 10z & + & w & = & -3 \\ x & - & y & + & 7z & - & w & = & 1 \\ x & + & y & + & z & - & 5w & = & 9 \end{array}$$

Quiz #5. Wednesday, 31 May, 2017. [10 minutes]

Let $\mathbf{A} = \begin{bmatrix} 1 & -1 & 1 & 0 \\ 0 & 1 & -1 & 1 \\ 1 & 0 & 1 & -1 \end{bmatrix}$, $\mathbf{b} = \begin{bmatrix} 3 \\ 1 \\ 4 \\ 1 \end{bmatrix}$, and $\mathbf{c} = \begin{bmatrix} 5 \\ 9 \\ 2 \\ 6 \end{bmatrix}$.

1. Compute \mathbf{Ab} and \mathbf{Ac} . [4]
2. Using your work in solving question 1, compute $\mathbf{A}(2\mathbf{b} - \mathbf{c})$. [1]

Quiz #6. Monday, 5 June, 2017. [12 minutes]

1. Find the inverse matrix, if there is one, of $\mathbf{A} = \begin{bmatrix} 1 & 0 & 1 \\ 2 & 2 & 0 \\ 3 & 3 & 3 \end{bmatrix}$. [5]

Quiz #7. Wednesday, 7 June, 2017. *[15 minutes]*

1. Find the rank and nullity of $\mathbf{A} = \begin{bmatrix} 2 & -3 & 4 & -5 \\ -3 & 4 & -5 & 6 \\ 4 & -5 & 6 & -7 \\ -5 & 6 & -7 & 8 \end{bmatrix}$. *[5]*