Mathematics 1350H – Linear algebra I: matrix algebra
TRENT UNIVERSITY, Fall 2009

Quizzes

Quiz #1. Friday, 24 September, 2009 *(10 minutes)*

Consider the line in two dimensions given by the equation $y = \frac{1}{2}x - 1$.

1. Find the points at which this line crosses the axes and sketch this line. *[2]*
2. Find a parametric equation(s) for this line. *[3]*

Quiz #2. Friday, 2 October, 2009 *(5 minutes)*

Let $\mathbf{a} = \begin{bmatrix} 3 \\ 4 \\ 0 \end{bmatrix}$ and $\mathbf{b} = \begin{bmatrix} 3 \\ 4 \\ 5\sqrt{3} \end{bmatrix}$.

1. Find the lengths of $\mathbf{a}$ and $\mathbf{b}$. *[2]*
2. Find the angle between $\mathbf{a}$ and $\mathbf{b}$. *[3]*

Quiz #3. Friday, 9 October, 2009 *(10 minutes)*

Consider the plane given by the vector-parametric equation

$$\begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 0 \\ 1 \\ 0 \end{bmatrix} + s \begin{bmatrix} 2 \\ -1 \\ 0 \end{bmatrix} + t \begin{bmatrix} 0 \\ -1 \\ 3 \end{bmatrix},$$

where s and t are the parameters.

1. Find a normal vector for this plane. *[2]*
2. Find an equation of the form $ax + by + cz = d$ describing this plane. *[2]*

Quiz #4. Friday, 16 October, 2009 *(10 minutes)*

1. Find the point(s), if any, in which the planes given by the equations

$$\begin{array}{rcrcrcl} x & + & y & + & z & = & 1 \\ 3x & - & y & + & z & = & 1 \\ x & - & y & & & = & 0 \end{array}$$

intersect. *[5]*

Quiz #5. Friday, 23 October, 2009 *(10 minutes)*

1. Determine whether $\begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$ is in Span $\left\{ \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}, \begin{bmatrix} 1 \\ 2 \\ -1 \end{bmatrix}, \begin{bmatrix} 3 \\ 4 \\ 1 \end{bmatrix} \right\}$ or not. *[5]*

Quiz #6. Friday, 13 November, 2009 *(10 minutes)*

1. Why is there only one 2×2 matrix $\mathbf{A}$ such that $\mathbf{BA} = \mathbf{B}$ for every 2×2 matrix $\mathbf{B}$? *[5]*

Quiz #7. Friday, 20 November, 2009 *(10 minutes)*

1. Find the inverse of $\mathbf{A} = \begin{bmatrix} 3 & 2 & 1 \\ 2 & 1 & 3 \\ 1 & 3 & 2 \end{bmatrix}$ or show that it is not invertible. *[5]*

Quiz #8. Friday, 27 November, 2009 *(10 minutes)*

Let $\mathbf{A} = \begin{bmatrix} 1 & 0 & 2 \\ -1 & 1 & 0 \\ 0 & -1 & -2 \end{bmatrix}$.

1. Find a basis for the null space of $\mathbf{A}$. *[4]*
2. Use your work for problem 1 to identify a basis of the column space of $\mathbf{A}$. *[1]*

Quiz #9. Friday, 4 December, 2009 *(10 minutes)*

Let $\mathbf{A} = \begin{bmatrix} 1 & 0 & 2 & 0 \\ -1 & 1 & 0 & 3 \\ 0 & 1 & 2 & 1 \end{bmatrix}$. You may assume that the rank of $\mathbf{A}$ is 3.

1. Without any calculation, is $\mathbf{A}$ invertible? *[2]*
2. What is the nullity of $\mathbf{A}$? *[3]*

Quiz #10. Friday, 11 December, 2009 *(10 minutes)*

1. Determine whether 4 is an eigenvalue of $\mathbf{A} = \begin{bmatrix} 1 & -1 & -2 \\ 0 & 2 & -3 \\ 0 & 0 & 3 \end{bmatrix}$. *[5]*