# Trent University, Summer 2017 

MATH 1350H Test
Monday, 29 May
Time: 60 minutes

## Instructions

- Show all your work. Legibly, please!
- If you have a question, ask it!
- Use the back sides of the test sheets for rough work or extra space.
- You may use a calculator and an aid sheet.

1. Do a and any two (2) of b-d. $[10=2+2 \times 4$ each]

Consider the lines given by the equations $x-2 y=2$ and $2 x+y=-2$.
a. Sketch a graph of the two lines including their $x$ - and $y$-intercepts.
b. Find the point where the lines intersect.
c. Find vector-parametric equations for each of the lines.
d. Find the angle between the lines.
2. Do any two (2) of $\mathbf{a}-\mathbf{c}$. $[10=2 \times 5$ each]

Let $\mathbf{u}=\left[\begin{array}{l}0 \\ 1 \\ 1\end{array}\right], \mathbf{v}=\left[\begin{array}{l}1 \\ 0 \\ 1\end{array}\right]$, and $\mathbf{w}=\left[\begin{array}{l}1 \\ 1 \\ 0\end{array}\right]$.
a. Find the components of $\mathbf{w}$ that are, respectively, parallel to and perpendicular to $\mathbf{v}$.
b. Solve $2 \mathbf{u}+4 \mathbf{w}+5 \mathbf{x}=-3 \mathbf{v}$ for $\mathbf{x}$.
c. Find the angle between $\mathbf{u}$ and $\mathbf{v}$.
3. Consider the following system of linear equations: $x+y=1$ $x+2 y-z=2$
a. Find all the solutions, if any, of this system. [8]
b. Use your solution to a to help determine whether the vectors $\left[\begin{array}{l}2 \\ 1 \\ 1\end{array}\right],\left[\begin{array}{l}1 \\ 1 \\ 2\end{array}\right]$, and $\left[\begin{array}{c}1 \\ 0 \\ -1\end{array}\right]$ are linearly independent. [2]
4. Let $S=\left\{\left[\begin{array}{l}1 \\ 1 \\ 1 \\ 1\end{array}\right],\left[\begin{array}{l}1 \\ 0 \\ 1 \\ 1\end{array}\right],\left[\begin{array}{l}1 \\ 1 \\ 0 \\ 1\end{array}\right]\right\}$, and let $\mathbf{x}=\left[\begin{array}{l}1 \\ 0 \\ 0 \\ 1\end{array}\right]$.
a. Determine whether $\mathbf{x} \in \operatorname{Span}(S)$. [8]
b. Determine whether $S$ is a linearly independent set of vectors. [2]

