**CURTIN COLLEGE - EMTH1019 Linear Algebra and Statistics**

**Final Assignment (Weight 25%, Total Marks = 50)**

**STUDENT DECLARATION**

**I declare that this assignment is all my own work.**

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| --- | --- |
| **Student Name** |  |
| **Student ID** |  |

**Submission Requirements**

* All answers are to be **HANDWRITTEN.**
* Submit a single PDF or docx file. Multiple or zip files are **NOT** acceptable.
* It is your responsibility to ensure all images are upright and legible.
* Marks per question are as indicated in the assignment.
* Sufficient logical working is to be provided. **No working = no marks.**
* Answers to be summarized.
* As this assessment is in lieu of a final exam the results will not be released.
* Late penalties apply.

1. (3 + 3 + 1 + 1 = 8 marks)  
   Given the planes determine:
   1. The angle between the planes.
   2. The equation of the line of intersection.
   3. The coordinates of point that lies on both planes.
   4. Check that the point from c) satisfies both plane equations.
2. (4 marks)  
   Determine the shortest distance between the plane and the point Ensure that you provide a quality sketch that identifies and labels all key information.
3. (4 marks)  
   Find the point at which the line { } intersects the plane . Check that your answer is valid for both the line and the plane.
4. (1 + 2 + 2 + 3 + 2 = 10 marks)  
   The following system of equations has infinite solutions.

* 1. Write down the augmented matrix of the system.
  2. Use Gaussian Elimination to reduce to row echelon form
  3. Use rank to describe the type of solution.
  4. Solve the system of equations using an appropriate parameter
  5. Check the solution by substituting it back into all of the initial equations.

1. (4 marks)  
   Determine the exact value(s) of for which the following set of vectors is Linearly Independent. .
2. (4 marks)  
   Determine if the following set of vectors are linearly independent or linearly dependent.

1. (6 marks)  
   Determine if the following lines are skew lines.

1. (2 + 2 + 4 + 2 = 10 marks)  
   For the following data points determine the least squares approximating line.
   1. Plot the data on a linear graph.
   2. Set up a system of linear equations.
   3. Solve the normal system of equations using Gaussian Elimination.
   4. Check your solution against the graph in part a) and check that your solution satisfies the normal system of equations.

End of assessment