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Question 1

1.1

Vector Equation: Graph of the function

Can be defined as:

Suppose

**Then, the direction vector v**

**And, the Parametric equation of a line**  
A line with vector equation

**Therefore, the parametric equations of the line passing through the points and are given by:**

1.2

Suppose

**Then, the direction vector**

**And, the direction vector**

Where and lie in the plane.

**And, the normal vector to the plane**

The normal to the plane is given by the cross product

Since determines an arbitrary point in the plane vector v

**Which lies in the plane and is perpendicular to n.**

Thus the plane:

**Passes through and**

Question 2

2.1

Suppose and

where

We must prove that for all

For , Evaluate

For , Evaluate

Thus

For , Evaluate

For , Evaluate

Thus

Since we have shown that for both and ,

we conclude that on the set .

Thus, for all

2.2

Suppose

and

where

We must prove that for all

**Then for , we evaluate**

For , Evaluate

For , Evaluate

For , Evaluate

Thus

**Then for , we evaluate**

For , Evaluate

For , Evaluate

For , Evaluate

Thus

Since we have shown that

for

but for ,

Thus, for all

Therefore, is not true for the entire set

Question 3

Question 4

Question 5